# Food Manufacture

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## Canning Conference.

THERE WAS a bracing atmosphere of breezy confidence at the annual conference of the National Food Canning Council held on December 12 at the Hotel Cecil in London. That this was amply justified may be gathered from the report by Sir Edgar Jones, which we publish on another page, and the utterances of Mr. J. H. Thomas, Captain H. Leighton Davies, C. W. Banks, H. S. Salmon, H. C. Bond, A. Bannister, and G. Salmon, at the close of an exceedingly good luncheon in which, we presume, British canned foods figured prominently. The Chairman, Sir Edgar Jones, expressed himself as being more than satisfied with the progress made during the past four years in canning English fruits, and held out the prospect that next year the canning of peas and vegetables would at one bound reach a production greater than all the fruit canning put together.

## Agriculture's Opportunity.

The Lord Privy Seal was also in high spirits. He remarked that the food-canning industry was an example of what could be done to assist an industry like agriculture by enabling, not only our own people, but those abroad to enjoy the best fruits and vegetables that the world produced. A total of some £20,000,000 of fruit, vegetables, and other canned goods were exported by other countries to Britain every year. Every additional million pounds' worth, therefore, was an asset to the country, and every million pounds' worth that could be exported was a double advantage to the country.

## Tunny.

At one of the afternoon conferences the commercial possibilities of canning the tunny fish were discussed. It appears that the Italians have created a market in this line and that the Norwegians started canning during the last few years. Are there sufficient tunny in home waters, and can a price be offered to fishermen to make it worth their while to bring them ashore; and, secondly, is the canning of this fish a commercial proposition?

The tunny is a large fish, averaging 500 or 600 lbs. and running up to 1,000 lbs.; it arrives in the North Sea at the end of July, frequenting the herring grounds, and disappears in October. Last September considerable numbers of tunny were observed off the coast at Scarborough, and recently one was caught at Aberdeen.

A selection of canned tunny from various countries was exhibited, and the one we sampled recalled the taste of salmon.

## The Sprat.

At the same conference a report on the sprat and sprat-fisheries was presented by the Ministry of Agriculture and Fisheries to the Canning Council, and a discussion took place on the question as to what supplies of this fish exist in home waters and whether it could be considered as likely material for British canneries. It was not found possible to reach a definite conclusion owing to lack of data, and steps are to be taken to secure the necessary information.

The sprat is made into "anchovies" in the Baltic countries, especially Sweden. The Germans make "Kiel Sprats" from Baltic and North Sea material by a smoking process. The huge Norwegian hermetic canning industry packs the fish in oil or various sauces, resembling the treatment accorded to sardines in France and Portugal. In Norway, however, the fish are usually packed fresh, being cooked and sterilised after the tins are sealed, while in France and Cornwall the sardine (pilchard) is cooked previous to packing and the sealed tins sterilised by heat.

### Flour and Moisture.

Mr. T. H. Fairbrother, chief chemist of McDougalls, Ltd., has carried out an extensive research on the influence of environment on the moisture content of flour and wheat. In whatever way it is conditioned or milled, flour must contain some moisture and this has a great influence on keeping and baking properties. Fairbrother found that bags of flour with an initial moisture content of 13 to 15 per cent. fluctuated in weight on being exposed to the air and that these fluctuations corresponded directly with the moisture content of the flour and with the relative humidity of the atmosphere.

It is rather curious to find that flour does not recover all the moisture lost by evaporation when resubjected to the original relative humidity. This question of the equilibrium between moisture in flour and that in the atmosphere assumes considerable importance when one considers the enormous amount of flour that is prepacked and may be stored for months.

It was found unlikely that mites would develop in flour stored in an atmosphere with a relative humidity of 50 per cent. or less, as this would ultimately lead to a moisture content of less than 11 per cent. Mites are, of course, always to be associated with the storage of damp flour.

### The Flying Philosopher.

As Will Rogers looked down upon rural peace and prosperity whilst flying from the pandemonium of Wall Street, he asked himself: "What does it (*i.e.*, Wall Street collapse) mean?—Nothing!

"Why, if the cows of this country failed to come up and get milked one night, it would be more of a panic than if Morgan and Lamont had never held a meeting. Why, an old sow and a litter of pigs make more people a living than all the Steel and General Motor stock combined.

"Why, the whole 120,000,000 of us are more dependent on the cackling of a hen than if the stock exchange was turned into a night club. And New Yorkers call them rubes."

### Dairy Symposium.

Interesting papers were read at the symposium on dairy chemistry held at Minneapolis last September. Nabenhauer, for instance, dealt with the manufacture of casein and lactose from skim milk. On the average, skim milk contains 3 per cent. casein, 0·7 per cent. albumin, 5 per cent. lactose, and somewhat less than 1 per cent. of mineral matter. It is now possible to recover nearly the whole of the casein and about half the lactose, together with crude albumin as a by-product.

### Casein.

Depending on the type of casein derived, coagulation is brought about by rennet or acid. Close attention must be given to temperature, acidity, and agitation, as these greatly influence the physical nature of the curd, and also the composition and working properties of the casein. The curd is washed, pressed, shredded, dried, and ground to the desired mesh.

Rennet casein, which is largely used in the manufacture of plastics, is characterised by a high ash content, and this type of casein is difficult to dissolve in alkalies.

Acid caseins, on the other hand, dissolve in alkalies to make excellent glues for paper coating and for wood-working.

### Lactose.

The whey from acid casein is neutralised with lime and boiled to coagulate the albumin. The clear solution, freed from albumin, is then evaporated to a thin syrup, which is purified by various processes of crystallising, decolorising, filtering, and so on, after which the casein is dried and ground.

Rennet whey is ordinarily evaporated without liming and the albumin is removed after concentration.

R. W. Bell, of the U.S. Bureau of Dairy Industry, gave a detailed description of the forms of lactose and their equilibrium relations. The application of these facts to the desiccation of lactose solutions on drum dryers resulted in the production of nearly pure beta anhydride lactose.

### Albumin.

The albumin recovered as a by-product from the above processes is a white or light brown cake, which is dried and ground for use principally in chicken feeding. It contains about 30 per cent. ash —chiefly calcium phosphate—and 55 per cent. protein.

Considerable work done at the Bureau of Dairying to produce a soluble albumin from milk has not been altogether successful, owing to the large amount of soluble salts present.

### Canned Questions.

Chicago has a Canners' Lecture Bureau, and talks and demonstrations are given at various women's clubs up and down the country. The director, Mr. Wadsworth, states that he finds keen interest on the subject of diet in general, and there is a marked desire for information on the safety, convenience, and economic value of canned foods. Some of the questions commonly asked are: "May foods be safely left in an open can?"; "Why are some cans

enamelled on the inside?"; "Does processing destroy the vitamin content?"

In this country the National Food Canning Council is doing equally useful publicity work. We might suggest, however, that they consider the advisability of instituting popular lectures and wireless talks covering the various aspects of canned foods as they concern the housewife.

### Mayonnaise.

The Mayonnaise Association's Convention held at Atlantic City in October was, without doubt, an extraordinary success. The papers read contain some very valuable information on the production and marketing features of the industry, and special emphasis was laid on the elimination of abuses, the raising of quality, and the greater distribution at lower costs.

We note, by the way, that "Ernie" Finch, the general manager of the Karl Kiefer Machine Co., proved himself to be a genial and witty toastmaster, and that his after-dinner remarks provided the guests with much amusement.

### Mayonnaise Food Value.

In the course of an address by Dr. E. M. Nelson, of the U.S. Department of Agriculture, it was pointed out that commercial mayonnaise contains approximately 77 to 83 per cent. of vegetable oil, 7 to 11 per cent of commercial egg-yolk, 0·3 to 0·5 per cent. of acetic or other organic acid, a small amount of condiments and water. The oil is a valuable source of energy; the egg-yolk contains the four vitamins A, B, D, and G, as well as proteins, fat, and mineral matter, particularly iron and phosphorus. Mayonnaise, besides being one of our most concentrated foods, encourages consumption of other foods that are considered essential to sound health.

### Chocolate Bloom.

There have been many "cures" offered for fat bloom on chocolate and one of the latest, of which much is expected, is the use of lecithin. On cooling, cocoa butter normally undergoes a process of fractional crystallisation, those fractions having a higher melting-point becoming solid before those which possess a lower melting-point. Bloom is caused by the crystallisation on the surface of the chocolate of the lower melting fractions of fat which have migrated to the surface whilst in a liquid condition.

### Use of Lecithin.

On the authority of Sherman Woodrow, the addition of small quantities of lecithin dissolved in cocoa butter causes it to behave as though it were a single compound and not as a mixture of fats, which it actually is. Apparently the butter solidifies as a nearly homogeneous mass of very small crystals and does not undergo fractional crystallisation. This is a step in the right direction towards solving the bloom problem; at the same time it should be pointed out that there still remains much research to be carried out, as different operators have experienced varying degrees of success.

It has also been noted that the addition of lecithin to chocolate results in an increase in fluidity, which permits of a reduction in the amount of added cocoa butter in order to obtain a smooth working coating. Its use may therefore lead to economies.

### Nature of Lecithin.

Lecithin is a complex organic substance; a glyceride in which one of the fatty acid groups has been replaced by a complex acid containing phosphorus and nitrogen. It is soluble in alcohol, and forms a colloidal solution in water and in melted fat. It is present in small quantities in the human body, especially in the brain and nerve tissue; also it occurs in egg-yolk, plant seeds, and, in general, is widely distributed throughout the animal and vegetable kingdoms.

The commercial preparation is of a waxy consistency, has a faint odour and a bland, oily flavour; it is said to contain about 60 per cent. lecithin.

### New Can Company.

We notice that British Can Company, Ltd., has been formed, with a share capital of £750,000, for the purpose of "developing the manufacture of containers in the British Isles by the most modern and scientific methods." The company has agreed to acquire the business of Ernest Taylor, Ltd., of Liverpool, which was established about 1880 as the Liverpool Tin Canister Co., and it has also entered into agreements with two American companies manufacturing containers. One of these, the American Can Co., was organised in 1901 to consolidate numbers of factories in the United States engaged in the manufacture of containers; by 1929 some 57 plants had come under its control, 6 of which specialise in can-making machinery. The other concern, the Thermokept Corporation, was organised in 1914 to operate various patents pertaining to the sealing and closing of food and other products under vacuum and to perfect automatic machinery for that purpose.

### American Equipment.

There is a very interesting point in connection with this flotation. Agreements have been entered into between the British and American companies under which the latter will furnish "on satisfactory terms" machinery and equipment, together with expert advice, assistance, and information.

There are four Britishers on the board and after allotment these will be joined by the President and Vice-President of the American Can Company, the Chairman of the Thermokept Corporation, and the Chairman of the United States Cigar Stores.

### Frozen Fish.

Canada claims leadership in the brine-freezing of fish for distant markets. Apparently Quebec salmon have met with success in the English market, and efforts are being made to perfect brine-freezing plant for installation in factory-ship or other vessels so as to make a serious attack on the European, West Indian, and other markets.

### Refrigeration Plant.

A modern brine-freezing plant consists of a series of tanks, containing fresh water, brine, and ice, which are circulated by means of a small motor with pump attachment. The water is rapidly drawn from the container through the brine tanks over the ice tank (for cooling) and is forced into the top of the freezing chamber containing the fish to be frozen and is then rushed back from the bottom of the freezing chambers into the container or reservoir. This process of rapidly circulating the brine solution over the ice naturally tends to bring the temperature to the correct degree for freezing.

One ton of ice to a quarter of a ton of salt would be sufficient to freeze one ton of fish. The number of freezing chambers would depend on the size of the plant installed, which would have to be calculated on the amount of space available in the boat's hold or fish room. A plant with six freezing chambers which could be reliably and economically driven by a 2 h.p. motor with pump would be capable of freezing one ton of fish per hour.

### Rat Control.

A new red squill preparation is being brought into action in American packing factories to hold the rat population in check. It is said to be deadly to rodents, but harmless to humans and domesticated animals. Outside the packing factories, traps, cats and dogs, ferrets, dangerous poisons, even deadly gases, have been used by man in his war on rats, but within the factory his choice of weapons is strictly limited. Only two methods have been found to be of any avail—namely, the use of gas by experts and the application of this new preparation of squill.

The multiplying power of rats is amazing; a pair can give rise to over 800 offspring in a period of twelve months. That they are capable of roaming over a wide area is shown by the fact that six months after a number of rats were marked and liberated in London some of them were identified in Bradford and other places over one hundred miles away.

### Pectin.

An investigation has been carried out by C. P. Lathrop, the technical adviser to the National Preservers' Association, into the scope and application of the pectin patents with the object of reducing litigation. At the conclusion of the analysis of a number of patents contained in his report is the following summary of the situation:

"The preserving industry may continue to make the same classes of preserve, jam, and jelly products without the necessity of infringement of any existing patents and may practically and legally arrange their manufacturing processes so that they can enjoy an open market in their pectin purchases and employ pectin in any desired form in their factory of commercial preserves, jams, and jellies."

### Chocolate Cake.

At the Columbus meeting of the American Chemical Society, Grewe and Whittier disclosed the results of their inquiry into the effects of variations in ingredients on the colour of chocolate cake. Milk has no particular effect unless it is sour; increasing acidity has a decolorising influence. Salt, baking-powder, and eggs have no marked effect. The most important factor is the hydrogen-ion concentration as determined by the sodium bicarbonate added. When this is above seven the colour is accentuated and the flavour is affected.

### Tinned Cream.

Mr. G. Dodson, appearing for the defendants in a recent case of alleged fat deficiency in tinned cream, described the process by which tinned cream was manufactured. Cream was taken from the milk by mechanical separators, was passed through a device which broke it up and mixed it, and was then put into tins and completely sterilised by passing over it super-heated steam, so that it would keep indefinitely. Nothing had been added to the cream, because this was not now allowed by law. "In order to sterilise the cream completely," continued Mr. Dodson, "you must not use cream that has too high a percentage of milk fat put in it, and we have found that the percentage which works best is something like 20 to 25 per cent.—nothing like 35 per cent. If it is to be a good article of food you must not take more than 20 to 25 per cent. of milk fat, because if you do you cannot mix it in such a way as to enable the sterilisation to be effective. If you do take more than 25 per cent. all you will get will be nasty-looking coagulated lumps of buttery substance, which would not be wholesome."

# *Review of*

# Food Manufacture

## *for 1929*

*The Editor.*
*H. B. Cronshaw, Ph.D., B.A., A.I.C.*

*ON succeeding pages of the present issue, leading authorities in the food production industry of the country have summarised their views on the progress made during the past twelve months, and one or two, more venturesome, have cast a forward glance into the obscurity of the future.*

*It is doubtful if any particularly useful purpose is served by parading the ghosts of past failures, misfortunes, and triumphs; nevertheless, a brief and comprehensive survey does avoid the danger of burying one's head in the sand, and brings one face to face with past errors, thus enabling one the more readily to obviate repetition. Moreover, it throws into relief the main channels of progress, both at home and abroad, thus providing material data for forecasting the trend of future events. In the present instance the reviews which appear on subsequent pages would, we feel, have been improved if more space had been taken up in attempting an interpretation of the future in terms of the past. This requires a certain amount of courage, as it involves risks which are fixed in cold print, and all good scientists err on the side of caution; at the same time, we intend to make the attempt in January, 1931.*

FOOD MANUFACTURE has entered upon its fourth year of activity; it is still an infant, nevertheless an exceedingly lusty one, and growing pains are its only trouble. It has now a wide circle of readers in every land where the manufacturing of foodstuffs is an occupation of consequence. The many letters of appreciation from readers, whom one day we expect to have the pleasure of meeting in person, lead us to hope that we are forging ahead on the right lines. These letters have come from Africa, Australasia, Germany, and even from America, a country that has broken the ice of old-fashioned trade journalism and has been a source of inspiration to all who see in the British technical press scope for vast improvement.

There has recently been considerable journalistic criticism of trade papers. The question has been asked: "When will trade papers wake up?" It is said that the majority of the 500 or more trade and technical papers are starving their readers. The contents of their editorial sections are almost wholly news—news of association meetings, births, marriages, deaths, bankruptcies, banquets, and tennis-parties; but one looks in vain for information intended to help the reader to do his job better and increase his business and profits. In feeding its readers with spiced hash served up from the scissors and paste department, a journal does not fulfil its highest function. Reform is needed and, as Arnold Selwyn points out, the older established trade papers are the ones most in need of reform. After vagueness of policy, the next fault is vagueness of personality. Few show the stamp of a creative mind behind the structure of the printed pages.

This is pungent criticism—somewhat comprehensive and destructive, it is true; nevertheless, it does point out the directions in which, from the journalist's standpoint, reform is needed. Journalists are, however, notoriously irresponsible and vague, much given to sweeping assertions, and the case in question is no exception. They want to know when the technical press will wake up and they talk glibly of that press "fulfilling its highest function," yet they give no tangible suggestions as to how this might be accomplished. *We have our own views on the subject.* Why, we should like to know, do people go on buying trade papers if they are never read? It is clearly the duty of readers to voice their own views and difficulties and to indicate in just what matters they require information and guidance. Editors welcome correspondence involving suggestions and criticisms, whether constructive or otherwise, as it enables them to gauge the "reaction" of their readers. It also enables them to make direct contact, out of which to weave a web of co-operation which, in course of time, becomes of inestimable value to the industry as a whole.

# Ministry of Health Report, 1928-1929

By E. W. LEWIS, M.A., Ph.D.

THE FOODS and Drugs (Adulteration) Act, 1928 (referred to more fully in the ninth report), came into operation on January 1, 1929, and provides a simplified code much needed by those concerned with this branch of local government administration.

In the section dealing with preservatives, it is stated that there have been 757 contraventions of the Public Health (Preservatives, etc., in Food) Regulations during the year, a number which may be regarded as comparatively low, as apart from manufactured articles of food containing butter, the regulations were fully operative throughout the year. A number of the food samples reported upon contained the prohibited preservatives, boric acid and salicylic acid, whilst others contained such preservatives as benzoic acid and sulphur dioxide in excess of the quantities permitted. Samples of sausages were found to contain preservatives below the permitted limit, but not declared on the label.

## "Found Adulterated."

The number of food samples examined by the public analysts of England and Wales during 1928 amounted to 129,034, a number exceeding that of 1927 by about 4,770. The following list is a comparison of the percentage adulteration during the last two years:

| | *Number of Samples.* | | *Percentage Adulterated.* | |
|---|---|---|---|---|
| | *Examined.* | *Found Adulterated.* | 1928. | 1927. |
| Bread .. .. .. | 240 | — | — | — |
| Butter .. .. .. | 10,544 | 262 | 2.5 | 1·4 |
| Cheese .. .. .. | 1,333 | 24 | 1·8 | 2·8 |
| Cocoa .. .. .. | 1,129 | 1 | 0·1 | 0·4 |
| Coffee .. .. .. | 1,580 | 16 | 1·0 | 0·8 |
| Confectionery .. .. | 864 | 26 | 3·0 | 4·7 |
| Jam and Marmalade .. | 1,584 | 41 | 2·6 | 3·7 |
| Cream .. .. .. | 2,671 | 70 | 2·6 | 16·4 |
| Flour .. .. .. | 505 | 5 | 1·0 | 1·2 |
| Flour (Self-Raising) .. | 736 | 6 | 0·8 | 1·4 |
| Lard .. .. .. | 2,918 | 2 | 0·1 | 0·2 |
| Margarine .. .. | 3,720 | 48 | 1·3 | 1·3 |
| Milk .. .. .. | 67,350 | 5,542 | 8·2 | 6·9 |
| Milk (Condensed) .. | 1,195 | 19 | 1·6 | 1·2 |
| Mustard .. .. .. | 489 | 8 | 1·6 | 2·6 |
| Sugar .. .. .. | 894 | 5 | 0·6 | 0·9 |
| Tea .. .. .. .. | 819 | — | — | 0·1 |
| Vinegar .. .. .. | 1,904 | 154 | 8·1 | 9·1 |
| Wine .. .. .. | 157 | 1 | 0·6 | 3·2 |
| Beer .. .. .. | 485 | 13 | 2·7 | 1·2 |
| Spirits .. .. .. | 2,018 | 168 | 8·3 | 11·8 |
| Drugs .. .. .. | 4,703 | 262 | 5·6 | 5·7 |
| Other Articles .. .. | 21,196 | 851 | 4·0 | 5·0 |

Of the butter samples examined, 262 samples were adversely reported upon, this being a considerably higher percentage than for several past years, evidently due to the coming into operation of the Preservative Regulations. Some of the adulterated butter samples are classified as follows:

| | |
|---|---|
| Wholly margarine ... ... ... | 2 |
| Containing foreign fats ... ... | 40 |
| Containing excess water ... ... | 92 |
| Containing preservatives ... ... | 130 |

Of the 48 samples of margarine which were adversely reported upon, 28 contained excessive water, 6 contained preservatives, and 14 were defectively labelled.

Two samples of lard, 9 samples of dripping, and 23 samples of suet had been adulterated. In one sample of lard, another type of fat had been substituted entirely; of the dripping samples examined, boric acid was detected in one, and three contained paraffin wax. The supplier of one of the cases of dripping containing paraffin wax was prosecuted, and a conviction registered, the fine being £10 and costs.

Colouring matter (annatto) in milk was found to be present in 14 instances, and preservatives in 6. It is not certain, however, that this represents a real increase in the practice of milk adulteration and how far the increase is accounted for by the increasing tendency of local authorities to concentrate their sampling in suspected sources. Of the 2,671 samples of cream examined, only 70 were adversely reported upon, of which 55 contained boron preservatives, 10 were deficient in fat, and 5 contained reconstituted cream. It is noteworthy that the operation of the new Preservatives Regulations has resulted in a reduction in the number of cream samples reported against, as compared with the number of cases arising under the previous Milk and Cream Regulations, which permitted a prescribed amount of preservative and required the use of a declaratory label.

## Pectin and Chicory.

Of the jam samples condemned, 12 contained excess preservatives, and others contained pectin preparations which had not been declared. One sample of raspberry jam contained foreign fruit pulp. The wholesaler was fined £20 and £10 10s. costs. Of 15 samples of coffee examined, 15 had been adulterated with chicory, whilst some confectionery products were found to contain talc and sulphites; 23 baking powder samples were condemned for traces of arsenic or deficiency in carbon-dioxide content; 264 samples of sausages, polonies, etc., were reported against as contravening the Preservative Regulations; and 52 samples of rice contained excess of talc. Tin was detected in 25 samples of tinned food.

# Cereal Chemistry

By DR. D. W. KENT-JONES.

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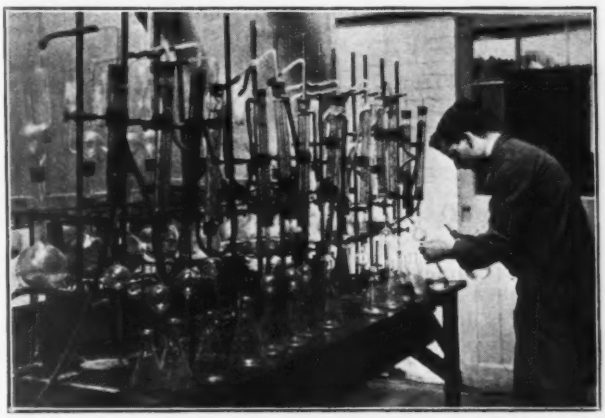
THERE ARE undoubtedly more workers studying the chemistry of wheat and flour to-day than at any previous time, and, naturally, there have been published, in the course of the year, numerous interesting and important papers. It is, of course, too early yet to say whether any of these represent exceptional advances in the state of our knowledge. All papers must be carefully weighed up and re-investigated by other workers so that the observations are confirmed and their full significance appreciated. Even if no striking advances have been made, many hundreds of useful papers have been published, the accumulated influence of which is important. There has been an advance all along the line, even though it is rather of the nature of taking a few trenches, one by one, and consolidating the position.

## American Research.

It is natural that the majority of these papers should come from North America, which in many ways is the home of cereal chemistry. It is a great wheat-producing continent and possesses numerous well-equipped and government-controlled experimental stations. Owing to the importance of its wheat-growing industry, it has naturally attracted a large number of enthusiastic and able chemists. Further, it possesses in *Cereal Chemistry* an excellent journal for the publication of some of its more important researches. Actually, of course, many of the contributions come from European research workers, who naturally feel that their work is best published in such a journal which is devoted entirely to this particular subject. It is interesting to note the attention paid this year to test for flour colour. There have been no less than five papers already published on this particular point in *Cereal Chemistry*, 1929—namely, "Flour Colour Tests," by Kent-Jones and Herd; "Method of Measuring Colour in Bread," by Grewe, Marshall, and Harrel; "Carotinoid Pigments of Flour," by Ferrari and Bailey; "Determination of Carotin in Flour," by Ferrari and Bailey; "Effects of Storage and of various Bleaching Agents on the Carotin Concentration of Flour," by Ferrari and Bailey. In this connection the work of Ferrari and Bailey is, perhaps, of special interest. Other outstanding papers in this journal have been: "The Peptonisation of Wheat Flour Proteins by Inorganic Salt Solutions," by Gortner, Hoffman, and Sinclair; "The Relation of Hydrogen-Ion Concentration and Buffer Value to the Baking Quality of Flour," by Fisher and Halton, Parts I. and II.; while the two papers, "The Relation of Quantity of Sodium Sulphate to Time of Digestion in Protein Determination," by Harrel and Lanning, and "The Modification of Rumsey's Method of the Determination of Diastatic Activity in Flour," by Malloch, are of special interest from the analytical standpoint. The work of Fisher and Halton of the Research Association of British and Irish Flour Millers has given authoritative information on the problem of hydrogen-ion concentration in bread manufacture which has been puzzling cereal chemists for many years.

## The A.A.C.C.

The activity of the American Association of Cereal Chemists (A.A.C.C.) has been largely bent in the direction of the standardisation of the baking test. All said and done, of course, the baking test still remains the corner-stone of all work, although whether it is possible to standardise it is another matter. The A.A.C.C. have attempted an extremely difficult task and the enthusiasm of its members is to be commended. They have adopted the point of view of making the standard baking test another test for cereal chemists in connection with baking rather than the performance of a commercial baking test under laboratory conditions. In spite of the enormous amount of work that has been done, pro-



**Kjeldahl Battery.**

gress has been slow. Even Harrel, who has been chiefly responsible for this work, states:

> "I think you will agree that amongst even experienced collaborators widely varying results have been obtained. To perfect the tentative method adopted will require further painstaking work."

Some idea of the work put into this problem can be judged from the fact that *Cereal Chemistry* has devoted something like a seventh of its space to this problem. The Association has similarly done a great deal of work standardising methods of analysis, and a great amount of collaborative data has been collected with respect to maximum, minimum, and average values of the various determinations investigated. This type of work is open to a great deal of misunderstanding. Taking protein determinations as an example, 80 to 90 per cent. of the collaborators appear to be in excellent agreement. Occasionally, however, there will be wide discrepancies with a small minority of the collaborators, and hence the maximum and minimum values may be misleading. Blish, who is the Chairman of the Committee on Methods of Analysis, states:

> "Referring to the maximum, minimum, and average values only an open letter to one of the milling journals (American) has suggested that instead of the Association being called the A.A.C.C. it should be designated as the G.S.A., standing for the Guessing Society of America."

## Canadian Research.

Great interest has been attached to the investigation of the Canadian Government with respect to the new variety of wheat which goes under the name of Garnet. This is an early ripening variety which, owing to the northward expansion of the wheatfields, will soon represent a considerable proportion of the total wheat grown in Canada. In their investigations on the baking quality of Garnet flour, the Canadian Government has consulted a large number of European millers and cereal chemists. The report, which will be of exceptional interest, is expected shortly. The visit to Europe in this connection of Mr. L. H. Newman, the Dominion Cerealist, and of Doctor F. J. Birchard, the Chemist-in-Charge of the Board of Grain Commissioners, has done much to bring about a better understanding of such problems generally.

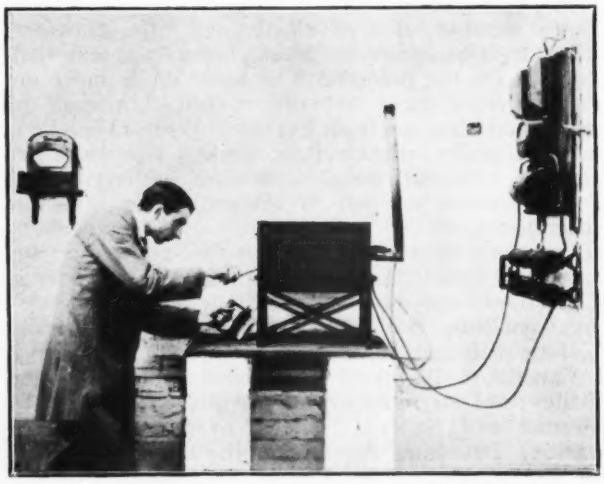
## European Research.

In Europe there has also been considerable activity. Some of the work of the members of the Research Association of British and Irish Millers has already been referred to and, of course, this only represents a small proportion of their useful activities. The laboratories of Messrs. Woodlands, Ltd., have also been active, and further interesting papers will be published by them shortly. It is a pity that in England it is not possible to run a similar journal, such as *Cereal Chemistry*, for the publication of the many useful results obtained by the various laboratories and chemists connected with cereal science. On the Continent a number of interesting papers have been published and attention is drawn to the report by Jorgensen, of Copenhagen, entitled "Some Investigations concerning Flour of Spring Wheat (Extra Kolben II.)," and to the various contributions in the two German papers *Zeitschrift fur das gesamte Muhlenwesen* and the *Zeitschrift fur das gesamte Getreidewesen*. There appears to be a pronounced activity amongst the German cereal chemists, which augurs well for the future. Interesting papers in the *Zeitschrift fur das gesamte Getreidewesen* (notably Ritter's, "Zur Methodik der Bestimmung der diastatischen Kraft," and Kent-Jones and Saxby's "Die diastatische Kraft des Mehle") have appeared on the diastatic activities of flour, a subject which curiously enough does not seem to attract as much attention as it ought in America. The editor of the *Zeitschrift fur das gesamte Getreidewesen* is Karl Mohs, whose work needs no introduction to cereal chemists. There has also been a number of interesting papers published in the *Zeitschrift fur das gesamte Muhlenwesen* by Berliner and his associates. The work of Berliner and Koopmann on gluten, especially their microscopic investigations on the structure of wheat gluten, is of outstanding interest, although confirmation of their findings will certainly be required before the work can be accepted.

In Europe, generally, there has been a large number of investigations into the effect of heat upon the baking qualities of flour, although many of these have not been published owing to the commercial nature of the results obtained. Undoubtedly much will be heard in the future of the practical application of this work.

Amongst books published this year, *Wheat Flour and Diet*, by Swanson, the well-known American cereal chemist, and *Breadmaking: Its Principles and Practice*, by Bennion, the head of the National Bakery School, London, must not be forgotten.

(*Continued on page* 20.)



**Muffle Furnace for Ash Determination.**

# Flour Confectionery

By EDMUND B. BENNION, M.Sc., Tech.A.I.C.,
*Head, National Bakery School, London.*

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IN ALL trades there are periods of tremendous development with rapid forward strides in many directions. These are then followed by a gradually progressive policy along the new line of thought with a steady consolidation on all fronts.

As far as the flour confectionery trade is concerned, the past year has been one of building up and consolidation with the introduction of new ideas in many spheres where formerly such were viewed with a good deal of hesitancy or suspicion.

## Raw Materials.

The manufacturers of raw materials are always producing new products and placing them before the baker, and during the past year many new varieties have been marketed. Bakers' fats have received considerable attention, and those which are intended to be used in place of the usual pastry and cake margarines have been improved, so that there are some with an excellent "body" and possessing good creaming qualities. Some of these contain shea nut fat as their basis.

Most of these fats are an emulsified preparation, and it is on this method of preparation that their creaming qualities are considered to depend to some extent. There is no doubt that these fats prove of great value in the production of plain and fruited cakes, either made in slabs or small shapes. With the use of them a fine evenly vesiculated crumb surface is obtained with a sheen of superior quality. There is a distinct place for such fats in the trade to-day, in those businesses which cater for a certain particular type of goods. Butter, and margarine also, will always hold their own in high-class trades, since where the flavour of butter is required it is essential to use it, especially in those kinds of cake in which essences, spices, or fruit do not impart the predominating flavour.

The artificial cream bill has not had any detrimental effect on the consumption of such cream in the many so-called cream cakes. The use of it has, on the contrary, increased the consumption of such cakes, first of all because cheaper varieties have been made, and, secondly, because it is possible to put more cream in the cakes. With the increasing popularity substitutes have been introduced in the form of a vegetable oil emulsion. These have quite a neutral flavour, whip easily, and where essence of vanilla, for example, is used as a flavouring ingredient, produce a whipped product very pleasing to eat and quite nutritious. Such emulsions can be produced with an ordinary emulsifier, but their stability is not such a simple matter as when dealing with cream.

More attention is now being paid to the use of high-class colours, and a greater variety is in use. The blending and harmonising of them in the decoration of cakes is receiving great consideration, whilst still more noticeable is the transition from definite colours to "tints," a very pleasing piece of work, which is greatly assisted by the interest the younger men in the trade are taking by their attendance at design classes carried out in conjunction with their trade classes.

This past year saw the introduction of a new variety of natural fruit pastes, which possesses very good flavours. The price of these is higher than that of synthetic essences of corresponding flavours, and the flavouring power is considerably less, but the enhanced quality of the flavour more than justifies the other two factors where delicacy of flavour receives the consideration it should do.

## Machinery.

The use of machinery has increased considerably, and with the continued demand new types of machines have been introduced. Machinery is a necessity to-day, for without it uniformity of product on the scale required cannot be obtained. There have been several new cake-mixing machines introduced in all of which the efficiency of whisking and creaming of batters has received primary attention.

In one of these machines, variable speed gears have been used and automatic controls fixed so that the machine can be set to mix for a certain length of time. Further controls also are fixed so that the speed of mixing can be automatically reduced as the cake or sponge batters thicken, so that no damage is done by over-beating. With this machine it is possible to produce most consistent results, since the creaming and beating operations, in which the

quality and uniformity of a cake so largely depend, are under absolute control.

Another type of machine is a whisking machine for the production of sponge cakes. In this machine the whisking is carried out under considerable pressure, by means of which it is stated a 10 per cent. extra yield is obtained, bulk for bulk, because of the more complete incorporation of air with the eggs. There would seem to be a great future for this machine in businesses doing a large trade in sponges.

Another type of mixer has a gearbox which is foolproof, so that the use of a clutch is eliminated and sliding-gears replace the older type. This machine is simple to use and quick to work.

The problem of efficient whisking has been studied very carefully for many years, but the question of the mixing in of the ingredients to a batter has not always received the same consideration. A machine which would whisk efficiently very often would not so satisfactorily incorporate the flour and other ingredients. In the case of vertical whisking machines, this mixing constituted a dropping of the fruit and flour, as a result of which it was not uncommon to find cake batters badly mixed. More recent improvements have been in the direction of having a vertical whisking action and an inclined arm for the mixing action, so that a definite lift was imparted and a gentle mixing in of the ingredients resulted. Provided the man who is working such machines has sufficient technical knowledge, very satisfactory regular products can be produced.

Emulsifiers have extended their use in directions other than the production of reconstituted and artificial cream.

Mechanical depositors do not make the progress that was anticipated, because, where quality is the guiding factor, the mechanical action of the depositor is too drastic and so the quality suffers. Wherever they are used chemical aeration must be employed in conjunction with eggs in order that the action of the depositor can be overcome as far as volume is concerned. It requires much experience to work these satisfactorily for all classes of goods, and with cakes it is often possible to scale off more satisfactorily by hand.

Finally, the wrapping and packing of confectionery goods has received great attention, and most attractive wrappings in cellophane and coloured printed wax papers have resulted in a much better display in shops, whilst many varieties of cakes can be handled much better in wholesale trades.

Along with better wrapping, better shop window displays and fittings have been introduced, which has increased the general brightness of the shopping horizon of those who indulge in shop window gazing.

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(*Continued from page* 13.)

States; its effect arises from the increased concentration of the syrup which becomes possible, but experience has shown that the method requires careful application owing to a tendency to dextrose granulation resulting from over inversion. The work carried out in this country by the Research Association for the trade has taken the form of an investigation into the structure and composition of fondant paste, and those who are privileged to scrutinise the reports on the subject which have already been issued will be in no doubt as to the value of the knowledge which has been gained.

### Gelatin.

Other problems with which the trade, through its own Research Association, has been engaged include the effect of the composition of boiled goods upon their keeping qualities—more particularly their resistance to heat and moisture—and an investigation into the general properties of sugar-gelatin jellies. Gelatin has been the subject of much study, more especially in the United States, but apart from some useful papers dealing with its use in marshmallow work, the problems connected with its employment in confectionery remain largely untouched.

### Pectin.

Attention has lately been directed to the possible use of powdered pectin in confectionery. Whilst it is improbable that it will fulfil all that has been claimed for it in some quarters, there would seem to be obvious advantages in the use of a standardised product of this nature. There is now available a preparation of invert sugar and pectin which in America is offered as a "candy doctor" to prevent granulation, and also for use in making cream centres. A possibly more useful field for experiment is the use of powdered pectin in the manufacture of fruit jellies, though in this connection it is probable that problems arising from syneresis will call for solution.

### Exhibitions.

To convey even an admittedly incomplete impression of the year's progress would be impossible without reference to the two highly successful exhibitions which were held. That at Olympia, organised by the trade itself, was an exceedingly fine show, and has set a standard which future years will find it hard to surpass. At both exhibitions there was an amazing array of new lines, many of which bore evidence of the exercise of an ingenuity which certainly deserves success, and a general survey of the stands left no doubt that the art of the confectioner is as vigorous as ever. The section devoted to plant and machinery was naturally a source of interest, more particularly from the point of view of the detailed improvements in design which were evident in certain of the units exhibited.

# Candy and Chocolate

By J. VALENTINE BACKES, A.R.C.Sc., A.I.C.

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THE WRITING of a review lies not so much in recording each and every detail, but in steering clear of the optimistic and pessimistic trail of thought. Facts may be recorded in such a way that, although unimpeachable in themselves, they are, nevertheless, so framed as to be ultra-optimistic, while the same facts, all equally true, may tend to give a most pessimistic outlook. A review, therefore, must as far as possible be an unbiassed summing up leaving to the reader the final verdict. Being something of an optimist, this article must thus fall short of the ideal. The optimism is due no doubt to the fact that it is being written and must go to press while every member of the confectionery industry is eagerly hoping for a "good Christmas."

1929 for the confectionery industry has been a very trying year. The industry has had to face difficulties which the general public scarcely realise or appreciate. Being grouped among the luxury trades it has naturally felt the rebound from the depreciation and fluctuation in the financial markets. Upheaval in international and national finance has affected the spending power of the public, and one of the first industries to suffer is that of chocolate and confectionery. And 1929 has had more than its share in Stock Exchange and Wall Street thrills.

Another vital factor which has left its mark on the confectionery industry in the past year is the weather. If only those enterprising air-conditioning firms could make their efforts universal, and so make "every day a good day" (and "good" as the confectioner would define it), the confectionery industry could settle down to a guaranteed steady production and constant sale. As a member of the community one has nothing to say but praise for the wonderful summer of 1929. But as a member of the confectionery industry it must be admitted that a summer such as we experienced is not "chocolate" weather, neither is $5\frac{1}{2}$ inches rainfall in the wettest November for over a century an asset to pick up back trade. The weather of 1929 has been a serious drawback to trade, and one over which there is so little control. The consumption of chocolate and candy is lowest when the weather is hottest, and the longer the spell the corresponding effect on general trade. America, more climatised to heat, has gone far in propaganda work to combat this fluctuation. An industry thrives on constant and steady sales and production, and America is cultivating its people to make every day a candy day.

## Advertising.

While this propaganda work has been making great strides in the States, the British manufacturers have not seen fit to grasp the opportunity. The general trend in British advertising in the past year, as far as confectionery is concerned, has been to boost one brand against another, and rarely has the advertising matter been directed towards the industry as a whole. 1929 has not given of its best in advertising the industry as an industry. There is much to be gained in this direction. Elaboration is generally not so effective as simplicity. A simple wording "Chocolates—So-and-so's for choice" carries with it all the advertising of the specific brand, but it goes a step farther. It advertises the industry by producing in the mind of the observer a conception of the products of the industry as a whole, without necessarily detracting from the specific brand with which the advertisement is attached. Too much has been made of the "free gift" advertising, and too little of dietetic propaganda. It is not the coupon gifts which entice the public; it is the concrete fact that the product of the industry is what it is—the most palatable, pleasingly varied form of vitalising food and the universal mark of sociability. You can offer cigarettes and find many who do not smoke, you can suggest whisky-and-soda and find (less) who do not drink, but you cannot offer chocolate or candy and get an equal refusal. The manufacturers and distributors have not made enough of these facts in 1929 in their advertising. This is, perhaps, the only chance they have missed in the past year. Menaces such as the obesity scare, the "cutters," and the like, have had their result on trade—yet in spite of all the industry is absolutely sound, optimistic, and progressing.

## Progress in Production.

As to actual progress in the industry, perhaps the most important is the advance of science as applied

to that industry. 1929 more than any other year has shown the way development is progressing on sound scientific grounds. New machinery claims for its uniqueness a principle which science has proved is essential to the industry. Research on manipulation of raw materials has helped in better production. The minor difficulties, which the Preservatives in Foods Regulations seemed likely to introduce, have been overcome, and the French are now able to manufacture and supply glacé fruits which fulfil every requirement.

The progress in the industry during 1929 has been of internal development. Nearly all firms have extended by either adding to or building new factories. And it is interesting to note how much attention has been given to detail in the newly built confectionery factories, and how keen has been the endeavour in modernising and bringing everything right up-to-date in those of older standing. And this development has been carried out in spite of the fact that the consumption of chocolate and confectionery in England, if anything, was lower in 1929.

The standard of the product of the industry in most cases has not only been well maintained but greatly improved. The introduction of new lines has been well up to the average, which, considering the limitation with which the manufacturer is faced in an industry of this sort, is decidedly an encouraging sign.

1929 has shown a growing tendency in some directions to boost cheaper grades. The price of raw material, although slightly lower than 1928, does not entirely justify or allow for such cheapening. Manufacturers know that such reduction in price is, and can only be, done by making quality a secondary consideration. It is a detrimental and short-sighted policy. Reduced prices at the expense of quality cannot hold a discriminating public for long. Rather does it pave the way for greater foreign competition.

## Price Cutting.

Price cutting has been allowed to exist and tolerated to an extent which other industries akin to the confections would not allow. Cutting of prices is dependent for success on a 300 per cent. increase in turnover. At the moment the increase in turnover is obtained by the "cutter" at the expense of his fellow-retailer. But if "cutting" spreads this increase in turnover must become dependent on increase in national consumption. Can the industry expect three times the quantity of confectionery to be consumed in the near future? In fact, is the industry prepared to produce this increase? As price cutting spreads so also does the turnover of the individual retailer decrease. A reduction in turnover in turn calls for an increase in gross profit. Once the "cut" prices are established the manufacturer will be compelled to accept these as standard and give the retailer his margin of profit on them. This will necessitate cheaper production. Can this be done without affecting quality? It is a point to be seriously considered if "cutting" is to be tolerated in the future as it has been in the past.

The great strides made by the tablet chocolate trade have established a new demand for English chocolate. The public are beginning to be less affected by the psychological effect of the word "Swiss" as related to chocolate, for they are realising that the difference in the product rests solely in the psychology of the name. Britain can and Britain does make as fine a chocolate as anywhere in the world, and has equal facilities and resources for so doing. The advance of the latter trade is proving it.

## Raw Material Prices.

The average prices of raw material during 1929 show a decrease. Sugar, cacao, butter, almonds, etc., were cheaper, while glacé cherries, apricot pulps, barcelonas, etc., were slightly dearer. The difference in prices of 1928 and 1929 was, however, comparatively slight and not sufficient by any means to pass on to the public by a reduction in retail prices. The small saving on raw material has been a help to offset the reduction in trade during the past year.

## Unemployment.

Unemployment in the industry generally is slightly less than 1928—a point not only of industrial but of national interest.

## Market Value of Shares.

Market values of shares in the confectionery world stand, with few exceptions, slightly lower than a year ago. The difference in most cases is due to the general financial unrest in the country, the prices being lower in sympathy with the rest of the share market rather than due directly to the industry.

## Conclusion.

To sum up; trade was down, due to the abnormal weather and financial unrest for the greater part, and possibly for a minor part to the lack of collective industrial advertising. Market values of confectionery shares, allowing for the general depreciation of all stock, were normal. Prices of raw material were slightly lower. Price cutting was allowed too free a hand in the industry. Development in factory organisation and general production improvement made good headway—a healthy sign for a year full of difficulties, but well handled by the industry as a whole.

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# Sugar Confectionery

By H. G. WATTS,

*Chief Chemist, Sunrise Preserving Co., Ltd.*

THE FULL record for the year in the sugar confectionery world is not yet completed, but it is already clear that the material progress achieved has, unfortunately, not quite fulfilled the expectations with which the trade commenced the year.

General trade conditions find their reflection in the sales—or otherwise—of what is regarded as somewhat of a luxury, and to this extent the confectionery trade has suffered as a result of the unrealised hopes of an increased national prosperity.

Manufacturers have attempted to meet the position in two ways—by the evolution of cheaper, albeit attractive and wholesome products, and by price cutting. Of the former method, no criticism can possibly be made—it is a natural reaction to a diminished expenditure on the part of the public. Of the latter, it need only be said that all unite in condemning it, whilst few are found who do not practise it.

## Exports.

Exports of sugar confectionery, judging from the latest available returns, show a slight but gratifying increase; it is noteworthy that the greater proportion of our exports is to countries within the British Empire. In this connection attention may be directed to the new regulations relating to foodstuffs in South Africa and to colouring matters in Australia, and to their possible effects upon the exports to those countries. Few will deny that the several codes in force in the component parts of the Empire are, in general, reasonably framed, but it is in their points of difference that they constitute something of an impediment to our export trade. Now that an Imperial policy with regard to tariffs is a matter of lively discussion, it is perhaps not presumptuous to hope that we may one day obtain a unification of the laws and regulations relating to foodstuffs within the Empire.

## Colours.

The year has seen an extension of the list of artificial colours permitted in the United States, Sunset Yellow FCF, Ponceau SX, and Brilliant Blue FCF being now permitted in foodstuffs. Somewhat brighter shades are, in consequence, attainable with the permissible colours, but the lack of a bright red, such as rhodamine, is an obstacle to the production of attractively coloured confectionery for America.

## Sugar.

Sugar prices during the year have remained low, as a result of over-production; after a heavy fall during the latter part of 1928, and continued into the first part of the past year, there has been a slight recovery, but present prices stand at a relatively low figure, with no obvious signs of an immediate increase. This no doubt has assisted manufacturers in their efforts to maintain turnover, but it is doubtful if they have financially benefited by it, since prices of confectionery have been accordingly reduced.

The price of glucose has remained in the neighbourhood of 22s. per cwt., at which figure it compares unfavourably with such white sugars as Lyle's No. 2 and T.L.S.; no doubt this has been fully appreciated by the trade, which has reduced its consumption of glucose to the lowest possible amount.

## Packing.

From a technical standpoint, the year has been marked by detailed improvements rather than by any outstanding successes. There are welcome signs of an increased interest in problems connected with the packing of confectionery, in which field there is undoubtedly great scope for improvements. Vacuum packing of confectionery of a hygroscopic nature, but low in moisture—such as toffee and boilings—has been found to offer considerable advantages, particularly for export purposes, but it is important to note that all the advantages of a vacuum closure are lost if the goods are exposed to a humid atmosphere between manufacture and final closure. The same applies, of course, to the packing of these goods in ordinary sealed containers, and for this reason work has been carried out to determine the lowest humidity at which such goods absorb moisture. There is no doubt that manufacturers are now realising the importance of a proper control of humidity conditions in the packing-room, and that those who have arranged for some form of air conditioning in that department are reaping the benefit in freedom from subsequent trouble.

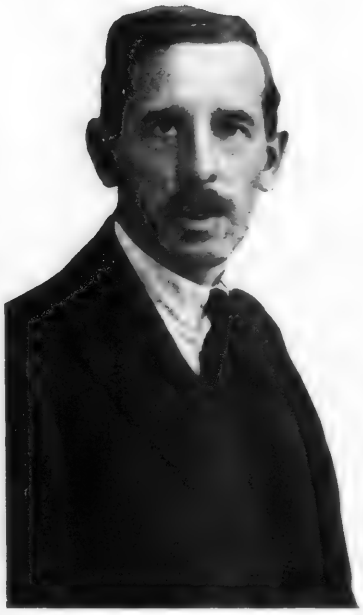
## Cellophane.

The increasing use of cellophane as a wrapping agent has been an interesting development in the confectionery world. Now that there are available machines for packing confectionery into cellophane bags, which are produced in the process of packing, it is probable that still more confectionery will be marketed in this convenient pre-packed form. Incidentally, the use of cellophane has presented the trade with one or two minor problems, and it is coming to be realised that not all lines can suitably be cellophane-wrapped.

## Fondant.

A considerable amount of attention has been paid to fondant manufacture, work having been in progress both in America and in this country. The use of invertase, as a means of prevention of fermentation in fondants, has been advocated in the United

(*Continued on page* 10.)



# Meat Packing

By OSMAN JONES, F.I.C.

ALTHOUGH NO spectacular developments have been recorded in the Meat Packing Industry during the past year, signs are not lacking that the scientific aspect of this great industry is rapidly assuming a position of first importance.

### Research Association.

The recently formed Research Association of the Food Manufacturers' Federation is now well into its stride; it has already achieved considerable success in tackling some of the many problems of the industry. The formation and continued growth of this organisation is a very healthy sign. It indicates that the food manufacturers of this country are beginning to realise the fact that, if they are to keep abreast with the times, rule-of-thumb methods must give place to scientific control, without which progress in the quality of their products is not possible. The Association has been brought into being by the united efforts of some of the more enlightened meat packers in England, backed to some extent by financial assistance from the Government. One of its chief objects is to investigate the practical problems of the meat industry.

### Food Investigation Board.

Improvements in the handling and packing of meats are receiving close attention by the Food Investigation Board. An examination of their recently published report will show that they are carrying on a comprehensive research into the principles underlying the changes which meat undergoes by cold storage, the conditioning of beef, the physiology of *rigor mortis*, the changes of fat during cold storage, and other equally pressing problems. The successful solution of such problems as these will have an important bearing upon the trades concerned, and is bound to have a beneficial effect upon the industry as a whole.

### American Research.

State aided and private researches in America are also contributing their quota. Recent work there is shedding light on the mechanism of meat curing, the cause of spoilage in hams and bacon, and their engineers have perfected very rapid methods of chilling meat, thereby arresting bacterial change.

### Bacteria and Spoilage.

It is becoming increasingly evident that it is in the field of bacteriology that much has yet to be learned. Although it is common knowledge that the spoilage of meat is due to bacterial action, we are not as yet sufficiently acquainted with the life history of those organisms which bring about such changes to enable complete control to be exercised over their activities. More extensive study of their thermal death points, general behaviour, habitats, and the effect of arresting agents upon them is needed. However, much has been accomplished which has proved of immense value to the packing industry.

### The Abbatoir.

Recent investigations clearly indicate that many of the troubles of spoilage of meat are to be attributed to faulty and unclean methods in the slaughtering and handling of meat during the first few hours after death. It is not to be expected that the methods of the operating theatre of a hospital can be closely imitated in the abbatoir, but at the present time, at any rate in the majority of cases, the other extreme is found. Meat becomes contaminated almost immediately after slaughter and every subsequent operation tends to increase this contamination, especially in cases where the meat has to be transported by rail or other conveyance to a distance. The packer never gets a fair start in his fight against putrefaction. There is urgent need for the perfecting of devices which will enable more cleanly methods to be employed in the slaughter-house, and chemical engineers interested in the meat industry might well direct their attention to the production of better machinery for abbatoir use.

*(Continued on page 22.)*

# The Meat Canning Industry

By A. SAMSON, A.R.C.S., A.I.C.,
*Chief Bacteriologist, Poulton and Noel, Ltd.*

IT IS a far cry from the experiments of Nicholas Appert in the art of preserving foods to the present industry of preservation, or the "canning industry," as it is generally named.

It was over a century ago that Appert made known to the public his methods for the successful preservation of many kinds of food.

For many years manufacturers took little interest in, and less advantage of, his remarkable achievements. It was only when the Americans began to take an interest in food preservation that the work of Appert expanded into an industry.

The French and the English certainly preserved foods at the same time, but only on a comparatively small scale. It is to the Americans that we must give credit for establishing a canning industry, and for basing the whole business on a scientific foundation. They have been the leaders all along, since Appert, and they are indirectly responsible for the growing canning industry in this country.

The industry embraces the preservation in containers of meats, fruits, and vegetables.

The purpose of this article is to give a general review of the meat canning industry in the British Isles.

## Containers.

There are two types of containers used for meat preservation—the tin can and the glass container, but the proportion of glass packages to tin containers is much greater in this than in any other country. We have developed the art of preserving meats in glasses better than any of our friends overseas.

For our raw material we are, unfortunately, dependent on foreign sources; more so now than ever. The principal supplier is America, whence come most of the tongues and briskets. Australia is slowly but surely entering the market as an American competitor. Raw material is also derived from Holland and Denmark. The supply from the British Isles is too small to be considered.

We have not taken much advantage of American experience with regard to tin containers. The Americans have proved the great value of the sanitary or spun-on type of can, whereas we still cling to the hole-and-cap or soldered type of can. Many packers here feel more security in the soldered can, and this may be perfectly justified. The spun-on can needs very close observation during the whole process, but in my opinion it is worth it.

## Processing.

Our methods of sterilisation have not altered very much. American processors started with the calcium chloride or muriate bath, by which they could attain a temperature of 240° to 250° F. After a few years these baths were displaced by retorts, and now muriate baths are obsolete in America. We, here in England, still retain the muriate bath. In fact, in certain manufactories it is more the rule than the exception. There are some advantages of the bath over the retort. Nobody produces preserved pressed brisket of a quality better than that produced in England. It may be that the bath is the reason.

We are not so far advanced in retorting operations as the Americans. We are still "rule of thumb" in our methods. The Americans are more scientific. We take too much for granted without definite proof. The Americans have definite proof, in recording and controlling instruments. There is no guess work there.

Of course, this statement does not apply to all English concerns, as many of them are really up to date; but, generally speaking, we are too unscientific.

## Sterilising Temperatures.

With regard to sterilising temperatures. It is a curious fact that these have gradually increased until now there is practically no manufacturer who sterilises his goods at the same temperature used, say, ten to fifteen years ago. In the old days meats were quite commonly preserved at 205° to 212° F. Later the temperature rose to 215°, then 220° F. At a still later period it rose to 230° F., and now most manufacturers adopt a temperature of 230° to 235° F., and some even 240° F. However, some manufacturers still use low temperatures of 212° to 220° F. In

America the general custom is 240° F. There are a few exceptions.

This gradual increase in temperatures of preserving is rather strange, and is, on the face of things, inexplicable. It is quite probable that the bacteria generally associated with the meats have, in the course of the growth of industry, become more resistant to destruction. It is quite possible that succeeding bacteriological generations have become more and more accustomed to prevailing temperatures of sterilisation, and consequently have required higher temperatures for their destruction. Nevertheless, it is a proof that most manufacturers cannot preserve their meats at the temperatures they used some years ago.

**Machinery.**

We have not taken to the art of using machinery in our canning methods. We still handle our goods as much as we used to. Perhaps this is because in using glass containers for our meats we take pains to show the contents off to the best advantage. Hence packing by hand.

**Brining.**

There is more knowledge now with regard to the principles and practice of canning meats.

Take, for example, the preliminary process of brining meats. In early days it was simply known that the colour struck quicker in warm weather than in colder weather. It was not understood why. No one here really knew how meat was brined and how the process actually went on.

All this is common knowledge now. Furthermore, new brining materials have been introduced as a result of this knowledge. Saltpetre only was used previously for brining. Now, as a result of scientific investigation, a new material, sodium nitrite, is used with the same result, but the time taken is shorter. We have to thank the Americans for this.

**Tinplate.**

There is one serious problem that has remained with us right from the commencement of the industry. I refer to tinplate. We still have the staining and pin-holing and corrosion of tinplate as we used to have, though, it must be admitted, not quite to the same extent. Still the problem is with us. It must be said to the credit of British lacquer manufacturers that they have so wonderfully developed the use of lacquer on tinplate that it may not be long before we shall be freed from the worries of corrosion and staining.

No one knows more than the lacquer manufacturers themselves how near to, and yet how far from, the final solution we are. In the interests of the canning industry this problem must be solved. At the moment it does not look as if we can appeal to the tinplate itself for the solution.

**By-Products.**

There is one outstanding achievement of the canning industry in this country, and that is in connection with by-products. By by-products I mean meat pastes, fats, fertilisers, and feeding stuffs only, because we, in this country, owing to the foreign sources of our raw material, are unable to produce bacteriological and pharmaceutical preparations such as are prepared in America. The glass paste industry in this country is enormous, millions of jars of all sizes are manufactured. The production of fats has grown remarkably, and more refined methods are now adopted to produce better grade materials. The fertilisers and feedings stuffs have greatly contributed to the success of the canning industry in this country.

**Conclusion.**

Such has been the development of meat canning in the British Isles. We have made good progress in the last twenty years, and we must make greater progress in the next twenty years. Science is stepping in to aid the industry, and without science there will be no progress. It behoves every meat canning concern to institute a scientific department, or laboratory, if there is not one. If the concern is proud enough to own a laboratory, every support and encouragement should be given it, for it is surely with the growth of a scientific department that the concern and, incidentally, the industry will prosper.

(*Continued from page* 18.)

**Standardisation.**

Standardisation, long discussed in the jam trade, became a living issue during the year, and the movement in favour of this policy took definite shape.

With regard to weights and measures, the F.M.F. jar has been adopted by the majority of manufacturers, and the output of some makers of jam jars is 100 per cent. F.M.F. standard.

This is all to the good as regards both the trade and the public. Standards of quality and composition, such as exist in America and Germany, have been under discussion by a committee of experts, representing manufacturing interests on the one hand, and public analysts and other authorities on the other.

The proceedings of this committee, which are still continuing, are for the present carried on in private; probably a wise arrangement where those representing opposite interests, if those of manufacturer and consumer can truly be so defined, are endeavouring to appreciate each other's point of view and devise means by which both may be adequately protected. Manufacturers generally are prepared to welcome regulations founded on reasonable standards, and it is to be hoped that, if and when these are adopted, they will be based on our own requirements and practice, and not too much suggested by those in force in other countries.

In such a case it may be anticipated that the industry will benefit by some degree of stabilisation of jam products, that the public will also derive some advantage, and that the public analysts will obtain some welcome assistance in carrying out their duties.

# The Jam Industry

By J. W. BLACK, B.Sc., A.I.C.

APART FROM statistical reviews, which derive whatever value they possess from a comparison of past with present and which are often of necessity at least a year behind the times, reviews are of little value that merely recapitulate the conditions which existed during the year just passed and which are perfectly and perhaps painfully familiar to those most interested. A study of past events or conditions is of value only when the backward-looking eye assists the forward-looking mind in determining the trend of future events.

It is in this sense that an effort is made in these short notes to review 1929.

*Home-grown Fruit.*—In spite of abnormal climatic conditions, including extremes of temperature and moisture, the home-grown fruit harvest, with one or two exceptions, has been good or normal during the season. The following tabulation may possess some interest:

*Green Gooseberries.*—Normal crop.

*Strawberries.*—Bad strawberry year. Owing to drought the season closed much earlier than was expected. Quality of fruit not too good. There were some local exceptions, however, to the general conditions.

*Raspberries.*—Normal crop.

*Red Currants.*—Normal crop.

*Black Currants.*—Good crop. Black currants have been gradually going back in this country over a long period. Useful research work on the diseases to which this crop is subject has been done, but in the opinion of many people these investigations need to be carried on even more intensively.

*Red Gooseberries.*—Normal crop.

*Plums: Victoria, Bush, and Czars.*—Good Kent crop this season.

*Damsons.*—Good supplies this year. The general expectation in respect of damsons, and, to some extent, greengages, is for one good year in three or even more poor years. Shropshire damsons are preferred by many jam manufacturers.

*Greengages.*—Good crop.

*Blackberries.*—The crop was short on the English market, and prices are rising. More attention might be paid with advantage to these supplies.

*Apples.*—Good crop.

*Oranges.*—It is too early to discuss the 1929 to 1930 harvest. Supplies are still somewhat raw.

*Imports of Foreign Fruit.*—The imports as shown in the Trade of the United Kingdom returns up to 1928 continue to grow. Of fruit presumably intended largely for jam manufacture—*i.e.*, fruits preserved without sugar, not canned or bottled—the following figures are taken from that publication:

| | 1924. | 1925. | 1926. | 1927. | 1928. |
|---|---|---|---|---|---|
| | *cwt.* | *cwt.* | *cwt.* | *cwt.* | *cwt.* |
| Total imports of fruits preserved without sugar; neither canned nor bottled .. | 469,984 | 528,681 | 500,413 | 602,054 | 693,295 |
| Raw strawberries | — | — | — | 71,427 | 78,603 |

The expansion of these imports, so far as it represents increased manufacture of jam at profitable prices both for home consumption and export, has its good side, specially if it reacts beneficially as well on home-grown and home-refined sugar consumption.

Nevertheless, the attention which is frequently directed to these figures is justified, and a proportion at least of these imports is due to lack of sufficient home-grown fruit at proper prices.

The full significance of the figures could only be recognised by a comparison of the ratio of home-grown to foreign fruit used for jam manufacture during stated times over a period of years, but even on the most favourable basis they present a challenge to the home-grower.

The British jam manufacturer should also be interested in obtaining as much home-grown fruit as possible, as our home-grown fruits have an undoubtedly superior flavour, which has been, and is, a valuable asset to the trade.

The fruit growers have their own difficulties, but in this connection it would appear that the promising efforts of the National Food Canning Council to build up and co-ordinate a national canning industry are worthy of attention. A large and consistent demand for supplies of first quality home-grown fruit for canning should stimulate and encourage growers in increasing production, with consequent advantage to the jam industry. There appears to be no reason why growers should not themselves preserve surpluses of fruit in the season against winter demands from the jam makers, who could specify

and supervise the conditions of laying down more easily than in the case of foreign pulp.

## Machines.

More attention is being given by manufacturers to two important points in new installations—viz., (*a*) reduction of cost of production, and (*b*) elimination of metallic impurities. FOOD MANUFACTURE has published several articles of much interest in this respect during the past year.

Plant for the automatic handling of fruit, pulp, sugar, and syrup in weighed and measured quantities is a common feature of every modern factory, and needs no description in this place. Attention may be directed to a few more specialised items of plant which appears to merit attention.

*Revolving Jam Cooler.*—This machine is stated to be of high thermal efficiency and has passed practical tests successfully. It can be used in conjunction with automatic feeding arrangements and various forms of pot filling, either by hand or automatic. All copper and iron contacts are eliminated, and in a recorded test it delivered an even flow of jam cooled from 215° to 170° F. in 1¾ minutes, using cooling water at the rate of 5 gallons per minute.

*A Fruit Pulping Machine* in stainless steel, with body of aluminium, nickel, or monel metal, specially designed to facilitate cleaning and avoid oil or metallic contamination.

*Orange and Lemon Cutting and Scooping Plant* in aluminium and stainless steel.

These machines are designed to eliminate copper contact, to which the makers of these machines devote special attention.

*A Fruit Peel Chipping Machine.* In monel metal and stainless steel. This machine was described in the December number of FOOD MANUFACTURE, and has been on the market for two or three years. It is only during last season that an automatic feed has been perfected and incorporated as standard on this machine.

The same firm has introduced an improved shredding machine. It cuts on the lawn-mower principle, which throws each shred clear of its neighbour, and has provision for the collection of all the orange or lemon oil exuded during the process.

## Boiling Pans.

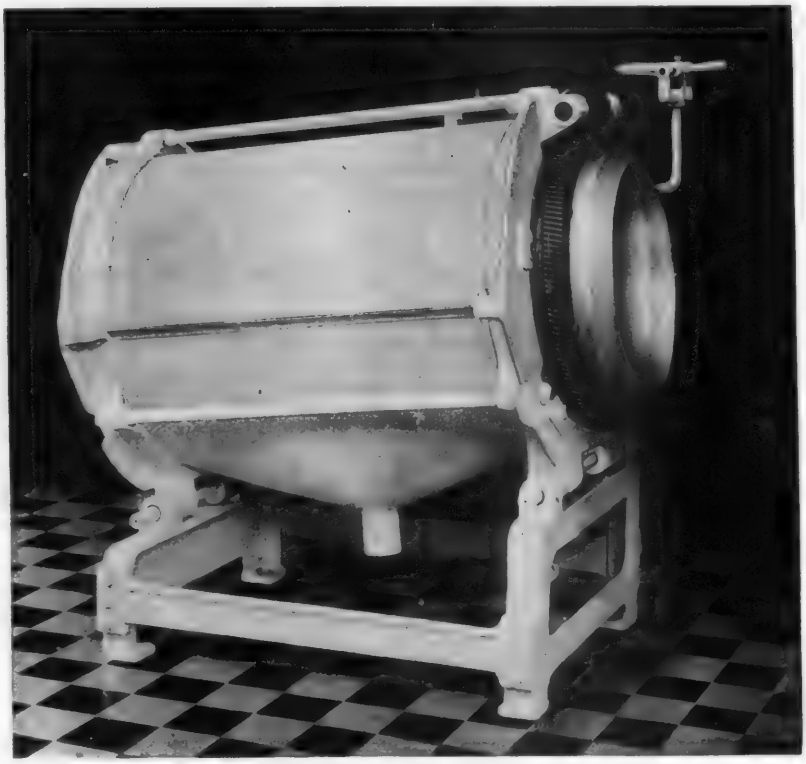
With regard to boiling pans, manufacturers have probably made up their minds as to the relative advantages of tilting pans, stationary rapid boiling pans, or vacuum pans. There has not been anything specially new in this respect, and experiment has been directed more to testing new construction materials to replace copper in boiling acid food products. Aluminium, nickel, monel metal, stainless steel, and chromium have been employed for boiling pans, either as solid metal or electro-plated.

Considerable claims of success, doubtless well founded, have been made for these various metals. At the same time, there appears to be some lack of uniformity in the experience of certain manufacturers so far as information can be obtained.

The fact to be recognised is that the effect of acids on metals varies considerably with comparatively small differences of composition and of method. The purity of the metal employed is also a factor of importance, and, in the writer's view, certain cases of failure are due, not to the unsuitability of the pure metal or alloy itself, but to small points or areas of impurity which are attacked when the pure metal is unaffected.

The process known as "fescolising" is distinct from plating in that, instead of a pure metal being deposited on another, something of the nature of an alloy is formed, which varies according to the metals employed. A copper pan coated with nickel by the fescol process would not necessarily have the same resistances as a nickel-plated pan or one on which nickel was fescolised on cast iron or mild steel. There seems room for a good deal of work still in searching for the ideal metal for food preserving, with well-defined resistances to a fairly wide range of conditions.

(*Continued on page* 16.)



**Revolving Jam Cooler.**
*(Courtesy o the Aluminium Plant and Vessel Co., Ltd.).*

# Fruit and Vegetable Canning

By SIR EDGAR K. JONES, K.B.E.,
*Chairman, National Food Canning Council.*

♣ ♣ ♣ ♣

FOUR YEARS ago the National Food Canning Council was constituted by bringing together the large number of interests involved in an effort to establish a successful food canning industry in this country. At first the Council concentrated its activities on the canning of home-grown fruit, such as strawberries, raspberries, currants, plums, apples, etc. For some years previously a few firms had been canning these fruits as a special side line to other food manufactures. The announcement of the intention of the Food Canning Council to expand fruit canning, so that it could establish a large fruit canning industry in this country at prices competitive with the imported canned fruits valued at over £6,000,000 per annum, was received with scepticism all round. The pessimists alleged that the climate and conditions of fruit culture were insuperable. They alleged that the British public would not favour the products; in any case, the grocers were not prepared to stock the goods and sell them; no engineers or experts were available for laying out canning equipment with modern plant and methods; the manufacture of cans on mass-production lines was not adequate or satisfactory.

In spite of all this, the National Food Canning Council attacked the problem with energy and enthusiasm. Only four years have elapsed and there are to-day eighteen establishments canning English fruits. A number of these are substantial new factories, with the most up-to-date plant and equipment in the world. The can makers have risen to the occasion and equipped themselves with new automatic machinery, and the most modern methods and experts. Engineers have also made a commencement in the manufacture, for the first time in this country, of modern canning plant. On the distribution side it is not easy to break into an organisation, such as that built up by the foreign importers in the course of fifty years, through the wholesale merchants and retailers in this country, with all the trade conditions, credit arrangements, etc. The British public are also slow to patronise new articles of food. The National Food Canning Council had to create a volume of public opinion and confidence amongst consumers, and had still more to bring about the trading conditions that would lead to the regular stocking of the canned fruits in the retail shops. It was anticipated that it would take several years to achieve such objects. At the first Council meetings in October, for the fourth session of the Council, it was reported that those objects had been successfully achieved.

## Canned Fruits.

There has been during 1929 a great increase in the pack of fruits by all the factories involved, and the canners report that the shops and the public are taking the goods so readily that many lines of fruit have not only been sold out forward, but in many cases delivered from the factories. It is usual in the canning industry in America and elsewhere, as it was in this country in the first three years, for the factories to have a stock of goods undelivered on their hands as late as April or May, and there have always been dealers waiting for a cut in prices for the clearance of such stocks before the commencement of a new season's pack. The reports in 1929 are to the effect that by the month of March next there will be practically nothing undelivered of the largely increased pack of 1929, and no call for any sacrifice of prices.

This evidence of the conquest of the public and the distributing traders has justified the original contentions of the initiators of the National Food Canning Council, and has completely refuted the pessimists.

At the present time, in preparation for next season and the following seasons, extensions to factories are taking place, additional plant is being purchased for canning, and the can makers are extending their equipment. New can-making factories are coming into the field. Engineering firms also are laying themselves out for the production of plant and machinery. Growers of fruit are awakening to the possibilities, and are planting for the increased demands that will be put upon them.

Comparatively little has yet been done to create an export trade in these English canned fruits, but there is a large export trade waiting for development. This will now come in due course, because it is proved in the teeth of the traducers that the soil and climate of the special fruit areas of this old country can produce the finest goods. It has been proved that the makers of the cans and the canners themselves can turn out a commercial article superior in its kind to anything in the world.

Above all, the success of the 1929 season has given definite encouragement to the enterprising firms who embarked upon this, to many of them, new and doubtful industry.

So much for the story of home-grown canned fruits.

## Canned Peas.

The great feature of 1929 has been the substantial production of canned fresh peas and vegetables. The quick success of this branch of food canning, which the National Food Canning Council concentrated upon twelve months ago, has entirely outshone the success in respect of fruit. Judging from the projects in preparation for new factories, equipment, and plant, there is every prospect that in 1930 the Council will be able to report that the new industry of canning peas and vegetables will at one bound have reached a production greater than all the fruit canning put together. Anyone who knows the difficulties in these trying days of successfully developing any new kind of factory production in this country will appreciate the significance of so rapid a success. The significance is that the contentions of the National Food Canning Council that there was a demand waiting in this country for canned peas and vegetables was sound, as also were the contentions that this country could grow and can peas and vegetables as well as any country in the world.

There is no reason why, given reasonable time and good luck, the output of canned peas and vegetables in this country should not equal that of the United States in proportion to the population. This means an annual consumption of 300,000,000 cans of peas and vegetables, which will mean a new absorption in the home market of a very large quantity of Welsh tinplates. Such an addition to the home consumption of tinplates will be very welcome to the steel and tinplate industry of South Wales, as a set-off against the possible expansion of manufacture in countries that are now purchasing from us. It would be foolish to prophesy as to the number of years that it may take to attain so great an output. There is, however, the fact as to the possibilities. The substantial new output in 1929 was met with so brisk a demand that distributors had to be rationed at a small percentage of their orders. The article has proved its quality and popularity in one year. The price is attractive and competitive, and the canneries have sufficient profit to encourage (as they have done) the erection and equipment of new factories.

## Canned Fish.

In addition to the above, there has been an extraordinary increase in the output of canned vegetable and other soups, which has already in 1929 attained a large production. Progress has also been made in increasing the output of canned fish. There is already a very substantial business, and in this case a substantial export trade. The question of regular supplies of suitabie fish has involved more detailed research than was called for in the case of fruits and vegetables. Very valuable work has been done in this direction at the request of the National Food Canning Council by the Fisheries Branch of the Ministry of Agriculture, as was done for fruits and vegetables by the Horticultural Branch of the Ministry. This work of research has now reached a very interesting point, and we are approaching the day when we may be able to see a dramatic expansion of fish canning, such as resulted in the case of fruit and vegetables.

## Public Response.

The public of this country, stimulated by the patriotic action of the Press, is now responding heartily to the appeals that have been made for the patronage of home produce, which creates new employment on the land and on the sea, and incidentally through such employment and increased purchasing power helps towards employment in the tinplate, steel, coal, transport, and general industries.

So far as public patronage is concerned, it is specially true that nothing succeeds like success. If there had been any failure in the quality, price, and availability of the home canned products there would have been a revulsion of feeling amongst the public that would have been fatal, but the conditions have been so encouraging that this year the tide of public patronage has turned definitely in our direction.

Every effort has now to be put forth by the tinplate industry, the producers and canners, and distributors to keep that tide flowing until the big thing happens. The big thing referred to is a general revival of trade employment and prosperity in this depressed industrial country. It is pertinent to stress the point that during the four years of the campaign to put over these new goods on the British market there has been bad trade, unemployment, and a period of sad depression affecting seriously the purchasing capacity of the population. The realisation of success under such national conditions obviously encourages hopeful anticipations of what may be realised with a return of general prosperity.

(*Continued from page* 8.)

## The Future.

With the progress which is being made along practically every line of cereal chemistry, one looks forward with confidence to next year for further advances. Cereal chemistry is thus gradually becoming a more exact science, and its value is being better appreciated by the milling and baking industries as well as the outside public. The examination of new crop wheats is now carried out systematically by many laboratories and the work is undoubtedly of great value to millers. There is certainly a greater tendency for millers and bakers to seek assistance from chemists on their many difficulties. The debt owing to cereal chemistry is already large and will undoubtedly become larger in the near future.

# Ice-Cream

By ERIC L. E. HUMPHRISS, F.R.M.S.

♣ ♣ ♣ ♣

A GENERAL review of the progress of the Ice-Cream Industry from a scientific standpoint almost resolves itself into a synopsis of development in, and research on, the subject emanating from America. A word or two here in explanation of this state of affairs may not be out of place.

Of European countries, Great Britain occupies pride of place as far as *per capita* production of ice-cream is concerned, and most probably, also, in gross annual production. Ice-cream manufacture in the East is almost negligible at present, though there is at least one large modern plant situated at Cairo. An embryonic industry is in existence in Australasia, whilst the popularity the product enjoys as an article of food in the U.S.A. is slowly spreading to South America. The industry in this country is approximately now in the position occupied by its robust American brother eighteen years ago, and this, naturally, is partly the reason we have to look across the Atlantic for new developments. The other factor concerned in the present precedence of the U.S.A. is the large number of Agricultural Experimental Stations and Universities in existence, practically all of which have departments where the scientific aspect of ice-cream manufacture is studied. The numerous and valuable research reports resulting from this extensive team work are published either in the form of Station Bulletins or in the Trade Press, and hence are available to all interested.

So much, then, in explanation of the position at present occupied by the industry in this country; nevertheless, one hastens to add there are numerous healthy signs which augur well for the future prospects of our Ice-Cream Industry.

No indigenous research on ice-cream has been published during the last twelve months, and hence, a résumé of the state of the industry within these shores is confined to a diagnosis of the trend of things exhibited in the production and marketing of the commodity.

## New Plant.

The increasing popularity of enamelled metal mixing-pasteurising vats in the milk industry is paralleled by a similar increasing use of this type of vat in ice-cream manufacture, with the inevitable beneficial results which accrue when contact of dairy products with metallic surfaces is minimised. A steady accession to favour of the viscoliser as a means of increasing the degree of dispersion of the fat, with consequent greater viscosity of the mix, improvement in texture of the finished product, and less likelihood of "churning" of the butter-fat during freezing, has occurred. Direct expansion ammonia freezers have to some extent superseded the brine refrigerated freezer, for, in addition to the thermal economy effected by the elimination of the intermediate calcium-chloride solution, freezing of the mix takes only half the time required by the brine freezer, and hence double output per freezer is obtained.

Increasing quantities of packaged ice-cream have been marketed, though, unless meticulous care is taken in the thermal treatment of the frozen ice-cream during packaging, marked deterioration in texture results, and this circumstance mitigates against this form of retail distribution of the product.

## Custard Ices.

A considerable proportion of the total output of "frozen confections" sold in Great Britain are still what might be termed "Custard Ices." This masquerade will doubtless continue until the legislation desired by the Ice-Cream Association is in the Statute Book.

Mention may here be made of the very successful competition held under the auspices of the Ice-Cream Association of Great Britain and Ireland in connection with the last Dairy Show. Over 180 entries were received for the competition for two cups, presented by Mr. Facchino, a member of the Association, for the best ice-cream and "custard ice" respectively. The probable ultimate result of the present indiscriminate use of the title "Ice-Cream" will, following American practice, be genuine ice-cream only and will be known as such, the alternative non-nutritive, antifebrifuge becoming the "Water Ice" (a very different proposition to "Custard Ice").

## Carbon-dioxide.

Little use has as yet been made on this side of the Atlantic of solidified carbon-dioxide as a refrigerat-

ing agent to facilitate the keeping frozen of ice-cream bricks for conveyance home. Extensive use of this clean and effective agent is made in America, the latest development being the refrigeration of motor delivering trucks with its aid.

### Continuous Freezer.

The outstanding recent event in American ice-cream manufacturing practice since the introduction of the Direct Expansion Freezer would seem to be the re-introduction in an improved form of the continuous freezer. One type, at any rate, is direct expansion refrigerated; the mix is fed in from an overhead supply tank and its passage through the freezer accomplished by means of a small pump operated off a cam on the dasher shaft. A similarly operated pump forces air into the mix at the same time. A dasher running at 400 r.p.m. keeps the mix in motion facilitating heat exchange, though it does not itself come in contact with the barrel. As the mix travels up the barrel it gives up its specific heat and latent heat and acquires a certain amount of overrun. Finally, the chilled mix passes into a whipping chamber where overrun is obtained (*i.e.*, air is incorporated). The overrun is controlled by a small by-pass on the air-pump, as well as by the speed of passage of the mix through the freezer. The capacity and rate of flow of mix through freezer, etc., depends on the thermo-dynamical constants of the refrigerating cycle in the case of direct expansion type, and in any case the refrigerant must be very cold and abundant. Prof. Tracy of Illinois University reports from tests made with one of these freezers: "Results with continuous freezer substantiates conclusions previously drawn in regard to batch freezers—namely, that the freezing process should be so regulated that the desired overrun is obtained at a minimum temperature in a minimum time."

### Physical Relations.

Prof. H. H. Sommer of Wisconsin University, in a long series of experiments, has recently demonstrated that ageing the mix improves whipping ability, texture of finished product, and results in an increase in viscosity of the mix. He also asserts that neither real (basic or crystalloidal) viscosity, nor apparent (colloidal) viscosity, bear any direct relation to whipping ability and texture. Likewise, he condemns the theory that mixes having the lowest surface tension whip best, and suggests the colloid hydration theory as satisfactorily explaining both texture improvement and viscosity increase. He further emphasises the complex physio-chemical nature of the mix, and points out the imperfection of our present knowledge regarding the same. Work done during the past year on eggs, at New Jersey Experimental Station, has demonstrated that, whilst egg-yolk added to the mix improves whipping ability and texture, the addition of dehydrated egg albumin is detrimental thereto; whilst both yolk and albumin are devoid of stabilising power.

Work has also been done on the sweetening of the mix with honey, the addition of cerelose to the extent of replacing 25 per cent. of the sucrose content, the gelatin content, bacteriological control, and on other subjects too voluminous and detailed to examine in a brief revision of this nature.

In conclusion, one may express the hope that with the growth of the industry in this country, and further appreciation of the value of scientific investigation and control, may come the time when the chronicler will be hard put to to condense the volume of research emanating from this side of the Atlantic in his "Annual Review."

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(*Continued from page* 14.)

### Effects of Feed.

The effect of various rations upon the ultimate composition of the flesh of animals has received, and is receiving, much scientific attention. Some quite startling results have been obtained both as regards the texture and flavour of the meat produced from animals fed upon abnormal foods, and there is no doubt that this aspect of the meat-packing industry is one that calls for very close investigation.

### Containers.

Closely associated with the conditions of the raw material to be packed is the container which will hold the finished product. Here, again, scientific investigation has been delving into some of the difficulties with which the manufacturer is faced. Perhaps the foremost of these is discoloration due to imperfect tinplate. The production of a plate with a complete coating of tin and the entire absence of tin-iron alloy is one that has so far baffled all efforts. The packer has had to look elsewhere for help in the elimination of discoloration. Within the past few months there has been placed upon the market a lacquer insoluble in meat juices and fat. This lacquer serves to cover the imperfections in the tinplate and thus, to a large extent, prevents the blackening of canned meat. The lacquer stands up well to tooling without fracture.

### Cooking Retorts.

Continuous cooking retorts which agitate the packages while cooking is proceeding have recently been brought nearer to perfection. These machines reduce the time of cooking needed, because they assist in the rate at which the heat will penetrate to the centre of the can. They also assist in the production of a sound pack, because they eliminate the danger arising through the formation of cool "pockets" in the retorts.

There is as yet much to be accomplished before the meat-packing industry can approach a state of perfection; the opportunity for improvements in all fields is great, and it behoves the more enlightened manufacturers to do all possible to aid science in carrying on the good work.

# Flavours and Colours

By DR. H. DRAKE-LAW

FIG. 1.—Packing and Crating Lemons after Sorting. Sent to England for Pressing for Juice.

1929 has been a trying year for the food industry. Selling prices have shown a persistent downward tendency, and there has not always been a corresponding fall in the prices of raw materials, especially in the case of essential oils. Competition for business has been very keen, and some of the more important firms, in order to meet increasing overhead costs, have introduced mass production, which has not always led to the success anticipated. The following review, however, is not a dirge for 1929, but it will serve perhaps as a guide for the new season.

Each section of the food industry is interested only in a limited number of flavouring oils, although food manufacturers as a whole require practically every known aromatic and seasoning agent.

## Vanilla.

This product is probably the most widely used of any flavour in flour, sugar, and chocolate confectionery. It is derived from both natural and synthetic sources, and each type finds ever-increasing uses. The growing demand is met chiefly by the introduction of new flavouring derivatives. The chief feature of the past year has been the rapid fall in prices of all synthetic products and the wide fluctuation in market values of vanilla pods. The price of vanillin in this country is largely controlled by the market for clove oil, and supplies in the early part of the year were very expensive. Clove oil vanillin was consequently high in price, and foreign makes derived from guaiacol were able to compete successfully in spite of the K.I.D. Clove oil has now fallen in value, and the vanillin derived from it is correspondingly cheaper. Guaiacol vanillin has declined in sympathy in order to maintain its established position. It is impossible to continue this policy indefinitely, however, and a minimum and stable value must soon be reached. The price of vanilla pods has also fluctuated widely, and it fell below cost of production in the early part of the year due to over-production. A rapid rise followed, and the market at present may be regarded as nearly normal.

## Citrus Oils.

The citrus oil market is not influenced by synthetic substitutes, as practically the whole output is of natural origin. The difference in quality is due partly to defective methods of extraction, but also to the almost universal practice of adulteration. The cultivation of fruit suitable for oil pressing is confined to a small number of localities, and, as a consequence, fluctuations in market values are both frequent and violent. The crop is obviously dependent on climatic condition, and cultivation is not sufficiently scattered to balance variations.

The past year has been remarkable for the shortness of the lemon crop, and all citrus oil prices have ruled high in sympathy. Conditions such as those we have recently experienced always produce a permanent reaction on the trade in general, and many users have reduced their consumption, whilst others have permanently abandoned the use of citrus oils for all time.

The 1930 lemon crop is abundant, and the reduced demand following on the high prices of 1929 has already forced down market values, although it is thought that the lower level has now been reached for some time to come.

A recent addition to the citrus oil group is grapefruit oil, which is now being successfully pressed from the skins of the fruit. This oil has a fine flavour, but it has not yet become generally known, owing to its present scarcity. It will soon, however, assume a permanent position amongst commercial oils, and it is certainly worth a trial.

FIG. 2.—Pressing the Juice from the Sliced Half-Lemons on Rotating Grooved Cones. This comes to England and is used for Squash and Cordials.

FIG. 3.—A nearer View of Operations shown in Fig. 2.

## Peppermint Oil.

The drought experienced throughout the world during 1929 caused a partial failure of the peppermint crop, and, as a consequence, it is expected that prices will show an upward tendency. Japan appears to be the only source of abundant supplies of new crop oil. Peppermint, however, can be stored with advantage

FIG. 4.—Hand Pressing the Rinds or Caps for Oil after the Juice and Pulp have been Extracted as in Fig. 2.

over long periods, and there is still a surplus from previous seasons. Prices, as a consequence, respond slowly to bad crops, but a general rise in values would appear to be inevitable.

## Seasonings.

Pepper and coriander are the two seasonings which have fluctuated most widely in value. Pepper has risen considerably, but the price is not prohibitive. Coriander was very expensive in the early part of the year, but the oil is now plentiful and prices are about normal.

## Colours.

The market value of colours generally has fallen, but it is possible that the lowest limit has now been reached. The most notable feature of the year has been brought about by the change in the food laws in various parts of the world. Both Australia and South Africa have made considerable alterations, and three new products have been added to the schedule of permitted colours for foodstuffs by the United States of America.

(*Continued from next page.*)

We may say we much admire your journal; it is, in our opinion, original, smart, and up to date, and we have already recommended it to one of the largest pickle and sauce manufacturers in Yorkshire. If we can assist you in any other way we shall be only too pleased to do so.

F. J. BUCHANAN.

*Extract from Letter recently received from an American Editor.*

"It is very enjoyable to discover so interested and friendly a reader of Mr. Springett on your side of the Atlantic, and to find anywhere, in the generally rather dreary grind of industry, a person who appreciates the value of occasional lightness and wit in a business magazine. It is my theory that, if business is to dominate the epoch we are in, one of the more satisfying services industrial editors can render is to help to make it a little more amiable and generally interesting than the traditional view considers it to be. I have a high regard for FOOD MANUFACTURE and have studied each issue since it was first published."

(*Continued from page 28.*)

In view of the large number of entries expected, and which, in fact, actually materialised, it was clear that arrangements would have to be made for storing the competition samples sent in and providing suitable accommodation for the work of judging. In this matter it is interesting to note that Messrs. J. and E. Hall, Ltd., placed at the disposal of the Association their showrooms at Charterhouse Street, where a butchers' demonstration chamber was converted into a hardening room, and where the judging took place. The winning competitor in Class A., Mr. F. C. Green, of the West End Farm Dairies, Ltd., Northolt, uses plant of J. and E. Hall's manufacture.

# Correspondence

## Enquiries

80. Required, the name and address of an agent in the Lancashire district who acts for any firm of exporters of vegetables as used in the pickle trade.

81. Required, a recipe for preparing onions so as to keep them firm when pickled.

82. Required, names of British firms holding stocks of Monosodium Glutamate.

83. Can you give us a recipe for dry mince meat, to be put up in cartons.

84. We understand that a vacuum method of syruping peels for preparation of candied peel has been used for a number of years in America. Will you kindly give us some particulars?

85. Wanted: British agent for French engineering firm.

## Answers to Enquiries

81. *Preparing Onions so as to keep them Firm when Pickled.*

One of the simplest methods is to put the onions in warm water during peeling, so as not to affect the eyes so much. They are then soaked in strong brine for 24 hours, then brought to the boil, strained and dried. Next they are placed in the jars and covered with cold, spiced vinegar, or vinegar and the spices strewn in. The vinegar should be strong and should well cover the onions. Iron or lime should not be present in the waters used. If iron is in contact with the vinegar it dissolves and reacts with the tannin in the vegetables to form an annoying black or bluey colour. A silver knife is best for peeling and trimming, and the utensils should be of acid-proof metals.

Another way is to remove onions from brine and place in process tank, covering with cold water and heating to 90° F. In a few days a secondary fermentation will take place, and once or twice daily any floating onions should be pressed down, the onions remaining until bleached sufficiently. Then wash well in cold water and place in the jars, adding a sprinkling of spices, and cover with good strong vinegar.

It has been found that the addition of about 1 per cent. of sugar, dextrose preferably, to the brine greatly improves the crispness and character of the pickles (not onions only), because some vegetables are deficient in sugar and are liable to develop undesirable types of bacteria unless a small amount of sugar is added to the brines.

The softening of onions and other vegetables (girkins in particular), during fermentation or storage, is usually an indication of too weak a brine. Le Fevre found that the concentration of the brine should not fall below 8 per cent. salt, in order to stop the growth of *Bacillus vulgatus*, the organism found in his experiments to be chiefly responsible for softening.

A third process, which has produced good crisp onions, is to peel cover with fresh water, and stand for two days, changing the water on the second day. Wash well and put into brine for four days, changing brine at end of second day. Then remove from brine into boiling water. Stand for ten minutes, then put in cold water for two hours. Next, bottle and finish as before.

Onions are often prepared for pickling, especially in America and on the Continent, by fermentation in 10 per cent. brine as for girkins and cucumbers.

84. *Vacuum Method of Syruping Peel.*

The syruping of peels in open pans always results in dark syrup, and, consequently, dark peels of diminished value. Excessive quantities of sugar are also required. By the use of the vacuum pan, however, you can reduce your syrup, without making colour; your syrup will be as white at the end of the season as at the beginning, your peels will be a good colour throughout the season, and you can cure any peel in four syrups. The vacuum from your pan will take your syrup up, and when it has been reduced, you shut off the vacuum and the syrup will run back on your peel. Thus you need not use any more sugar, thus effecting a saving in amount of sugar and volume of syrup, which will be ready for the next season. A big volume of syrup left over is always dead money, and by using the four-syrup system you can get twice the amount of peels from the same tubs or tanks. The latter are much better than tubs.

JOHN ELSBURY.

*Correspondence on Reply to Enquiry 73. Piccalilli (English Style), p. 360, December, 1929.*

DEAR SIR,

We were somewhat surprised on perusing the pages of FOOD MANUFACTURE for December, 1929, to notice that in the correspondence column white wine vinegar is mentioned in preference to malt vinegar, particularly seeing that the recipe given is qualified as "English Style."

As you will be aware, wine vinegar is the vinegar of France, as cider vinegar is the vinegar most in favour in the United States, so that it naturally follows that to secure the "English Style" of any commodity where vinegar is an important factor, "malt" vinegar should be advocated. Our American cousins always take care to see that the vinegar of their country is specified under circumstances like these, and we shall do well to follow them in this direction at any rate.

We notice, too, that you prescribe No. 16 Diamond Vinegar for the "cheapest" kind of piccalilli. According to a report issued by the Local Government Board (Medical Department) on *The Preparation and Sale of Vinegar*, Diamond Vinegar is mentioned as usually lacking in acetic strength, so that for pickles, sauces, and condiments of any kind this vinegar is not to be recommended.

(*Continued on previous page.*)

## Market for Foodstuffs in Colombia.

*Trade Information Bulletin No.* 662, entitled "The Market for Foodstuffs in Colombia," was released on November 20, 1929. The general economic situation, distributing areas, packing, consignment of shipments, steamship connections, and marketing conditions peculiar to Colombia are discussed in this publication. Detailed information also is given regarding the market for particular foodstuffs commodities, among which are condensed, evaporated and powdered milk, canned and dried fruits and vegetables, canned fish, sauces and relishes, jams, jellies, marmalades, pickles and olives.

Interested concerns may secure copies of this publication for the sum of ten ($0·10) cents each either from the Superintendent of Documents, Government Printing Office, Washington, D.C., or from any of the Bureau's District or Co-operative Offices.

* * *

## Norwegian Canning Factories.

A committee which has been working for further consolidation of the Norwegian canning factories is continuing its efforts to bring into the organisations factories located in Stavanger and other parts of Norway, according to a report dated October 23. One factory in Moss and two in Oslo have consolidated, while it is anticipated that others will come in as the organisation details are worked out.

* * *

## Soya Beans and Lecithin.

Utilisation of the by-products of soy beans and cornstalks, two leading products of Illinois agriculture, was discussed by Harvey J. Sconce, an official of a cornstalks products plant at Danville, Ill., who said:

"Science has developed within the past five years many new products from soy beans, and these important products of industry are only an indication of the many other products that still remain for the research chemist to develop from this crop that is taking the Middle West by storm.

"Many mills are producing 8 to 10 pounds of oil from a bushel of soy beans to be hydrogenated in the making of soaps, paints, edible oils, and many other products of present-day industry. This oil is selling to-day at a fraction more than 10 cents a pound in the crude state. A new German process of extraction gets 11 pounds of oil from the bushel, and possibly this percentage could be raised, providing the oil content is in the beans. As we all know, it is quite possible to increase the oil content of various crops through plant breeding.

"One of the new products which it is now possible to get from soy beans is lecithin. A ton yields from 10 to 20 pounds, which sells at $1·25 a pound. Armour and Co. get this same product from the brain fibre and it sells for $5 a pound. Eastman gets it from eggs at $2 a pound. The source of this product is therefore limited. The soy-bean crop will make it possible to get much greater quantities of this new product, which is badly needed in nervous disorders.

"Commercially it is used to emulsify oleomargarine and 0·2 of 1 per cent. is all that is needed to make oleo of the same consistency as the finest creamery butter. As there are 350,000,000 pounds of oleo produced annually in this country, the future market of lecithin is easily seen. It also is used in the manufacture of chocolate candy and chocolate products, as it prevents the greying effect caused by age."

* * *

## Durban and British Firms Combine.

A business amalgamation which will be viewed with great interest in South African commercial circles was on November 9 ratified, a very large British firm whose marketing activities extend all over the world joining up its South African interests and organisation with that of one of the leading manufacturing industries in Natal.

The companies concerned are Messrs. C. and E. Morton, Ltd., of London, and Messrs. Lowens and Jameson, Ltd., of Rossburgh.

The amalgamation of interests takes the form of the registration of a parent company under the title of C. and E Morton and Lowens, Limited. From the viewpoint of the consumer, no alteration will be made in the present policy of both concerns, as each will remain an individual unit in the new company, and will offer its products to the public, through the usual channels, under its own brands and labels as at present, trading respectively as C. and E. Morton (S.A.), Ltd., and Lowens and Jamesons, Ltd.

At present a proportion only of Messrs. Morton's products will be manufactured locally, many lines being still imported from Great Britain.

A considerable development has taken place in recent years, and is still proceeding, in the export by Lowens and Jamesons, Ltd., of their products, and this export trade will now be handled by the branches overseas of C. and E. Morton, Ltd., which are established in 42 different countries all over the world.

It is understood the capital of the parent company runs into six figures. The Board of Directors consists of Mr. W. T. Lowen, the managing director, Mr. Cecil Platt, of Isipingo, and Mr. W. H. Elliott, who represents Messrs. Morton.

# Trade News

### Beer Chilling Plant.

Messrs. York Shipley, Ltd., are supplying refrigerating plant and equipment to Messrs. S. J. Worssam and Sons, Ltd., for beer chilling. The plant is to be installed at Wells Watford Brewery, Watford, and will be the second plant supplied to this brewery by Messrs. York Shipley, Ltd., the first being installed about four years ago.

We have received news to the effect that Messrs. York Shipley have obtained the contract for refrigerating plant for Messrs. Gamage's new building now in process of erection near Marble Arch. The equipment is required for fur storage and the manufacture of ice-cream.

The same firm have also obtained the contract for the refrigerating equipment required for the new model dairy to be erected for Messrs. Job's Dairy, Ltd., of Teddington. This plant includes duplicate sets, each capable of cooling 1,000 gallons of milk per hour through 25° F. on the brine sections of milk coolers.

* * *

### Aluminium.

We have received an exceedingly useful booklet from the Aluminium Plant and Vessel Co., Ltd., Point Pleasant, Wandsworth, S.W. 8, describing in clear, concise language the behaviour of aluminium towards various materials, which are arranged for handy reference in alphabetical order. This information has been gathered from experience gained by the above firm in the chemical industry during the last twenty years from laboratory researches, and also from various American and Continental sources. The booklet is well illustrated and has been got up in an unusually attractive style. The Aluminium Plant and Vessel Co., Ltd., is to be congratulated.

* * *

### Waste Food Products, Ltd.

Mr. Justice Bennett in the Chancery Division on December 2 made an order for the compulsory winding up of Waste Food Products, Ltd., a company having works at Stanwell.

Mr. Lionel Cohen, K.C., said this was a petition by the company itself, and his lordship would see from the petition that the directors had taken the proper course in presenting the petition in order to ensure that no one creditor secured preference over another. The present position of the company was that it had at the bank only £900, and it had no hope of receiving further cash even to meet weekly expenditure. The petition was unopposed.

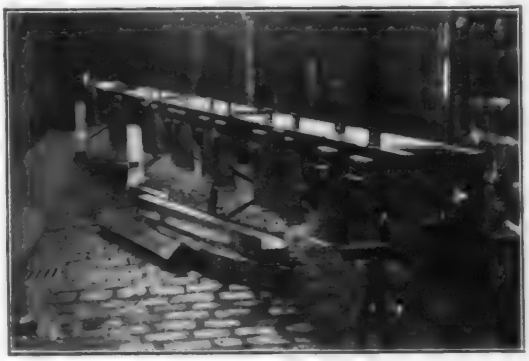
* * *

### Malt Vinegar.

One of the most progressive firms in this country is the Hallamshire Vinegar Co., Ltd., of Farfield Road, Neepsend, Sheffield. This firm has gone to great trouble and expense in order to produce a malt vinegar of first-class strength, aroma, and quality. Although of humble origin, it has won for itself a name and a place amongst the foremost producers of the country.

### New Stainless Steel Conveyor.

The photograph shown depicts a recent product of Messrs. George Whitehead and Sons, Limited, Salford Works, Todmorden, for the construction of which "Maxilvry" stainless steel has been applied.



It shows a fine example of a 9 inch diameter worm conveyor, the worm box being built throughout from "Maxilvry" stainless steel sheets, 18 s.g. thick, being fitted with cast iron box ends and mild steel worm shaft running in S.O. pedestals fitted on the ends and having intermediate bearings arranged inside the box.

This has been designed primarily in connection with the conveying of cooked or steamed foodstuffs, the hot, moist material being fed into the conveyor and conveyed by the revolving worm to the different outlet spouts shown attached to the worm box. All internal fittings on the mechanical section of the conveyor have been treated by a rust proofing process.

The spouting attached to the conveyor box at the delivery outlets has also been constructed from "Maxilvry" stainless steel sheets, and these spouts take off from the box at whichever point is desired. valves being fitted at the inlet of these for shutting off or otherwise, so that the materials may be delivered at the required point.

It will be readily understood that the condensation of the moisture on ordinary metal parts has a

tendency to create corrosion during periods when the conveyor may be standing, and if wooden boxes were substituted the saturation of the wood by the moisture created has the ill effect of contamination, which it is most desirable to avoid.

The construction of these appliances in the manner described ensures contact only with stainless steel or rust-proof treated metal parts, the elimination of risk of contamination by corrosive metal, and absolute cleanliness throughout the process, is obtained.

* * *

## Stainless Steel.

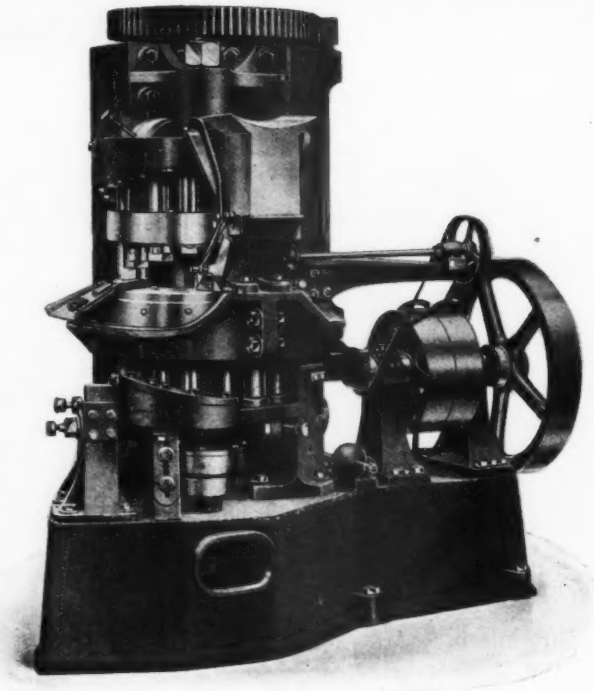
We are in receipt of a booklet from the Imperial Steel Works, Sheffield, giving particulars of the Edgar Allen "Maxilvry" patent malleable stainless steel. It is an alloy of iron with large percentages of nickel and chromium and a small copper content. It is manufactured in the Heroult electric arc furnace, and great care is exercised in controlling its composition and casting temperature, so as to obtain a product of uniform composition and properties. It is non-magnetic in all conditions, and is much more resistant to corrosion than Imperial stainless iron. It is also different in character and composition from Imperial stainless steel and iron. These are described in a separate booklet which will gladly be sent on request. (See booklet *The Edgar Allen Stainless Steel Book.*) Maxilvry is chiefly intended for deep-stamping and cold-pressing, as its great ductility and malleable character render it very suitable for these purposes. It can also be hot-pressed if desired. Maxilvry steel should be softened, by heating to 1150° C., and cooling in air, after cold-working. It can be riveted cold where the size is not too great, and hot-riveted above this point. Edgar Allen and Co., Ltd., will be glad to give advice on the correct procedure to be adopted in the manipulation of Maxilvry steel.

* * *

## Tablet Compressing Machines.

The production of tablets by means of compression machines necessitates apparatus of robust construction and accurate workmanship, and both these qualities are characteristic of the tablet compressor manufactured by Messrs. Worssam. These machines are made in various sizes and capacities.

The material it is intended to convert from the powdered to the tablet form is compressed in the matrix by the movement of two plungers, these plungers being actuated by means of inclined tracks. The plungers carry the dies, suitably secured, and in designing both the matrices and the dies means are provided for ridding the moving parts of any loose powder or other material. Naturally the dies and matrices are made to very fine limits and hardened and ground. In common with the working parts of the machine, the plunger tracks admit of adjustment for wear, and they are readily removable for replacement when worn beyond certain limits. The pressure can be adjusted in accordance with the degree of hardness required in the material to be compressed. The material from which the tablets are to be made is fed into the machine through the medium of a hopper, with mechanically operated



**Tablet Compressing Machine.**

feeding arrangements. Dies can be fitted to impress trade marks or advertising matter on the upper and lower surfaces of the tablets, and, if required, a small belt conveyer can be fitted to the "off-take" side of the machine to facilitate the removal of tablets.

The machine can be arranged to compress material direct into metal containers, the containers being fed into the matrices immediately before the powder. In this case, special fitments are incorporated with the upper plungers for the withdrawal of the completed tablet and metal container.

* * *

## Ice-Cream Competition.

The competition and demonstration organised by the Ice-Cream Association of Great Britain and Ireland, in connection with the recent Dairy Show, was organised to encourage the manufacture of really high-class ice-cream by small makers, such as the owners of confectioners' shops, cafés, dairies, etc., to show that this is a profitable business if conducted on the right lines, and to indicate, by means of demonstrations and competitions, what the right lines are. Through the generosity of Messrs. Facchino's Purity Biscuit Company, the Association were able to offer two magnificent trophies—one for the best sample of vanilla ice-cream complying with the Association's standard, and the other for the best vanilla-flavoured ices not complying with this standard. In addition, diplomas were awarded to all competitors obtaining 80 per cent. or over of the total possible score.

(*Continued on page* 24.)

# Current Literature

### Fruit and Vegetable Products

1. The Conserving of Melons. (*Kons.-Zeit.*, No. 50, 1929.)

2. Frozen Fruit Packing Methods. M. A. Joslyn. (*Canner*, No. 21, 1929.)

3. Gravity Separation of Ripe Fruit. E. W. Wiegand. (*Canner*, No. 22, 1929.)

4. Determination and Content of Water in Dried Fruit. J. Pritzker and R. Jungkuntz. (*Z. Unters. Lebensm.*, 57, 520.)

5. Vitamin-A Content of Avocados. Weatherby, Yontz, and Watson. (*J. Home Econ.*, 21, 360.)

6. Dehydrating Jerusalem Artichokes. P. F. Nichols. (*Fruit Prod. J.*, Nov., 71.)

7. Frozen Pack Experiments. R. A. Rudnick. (*Canner*, No. 24, 1929.)

### Cereal Products

8. Bleaching of Flour. A. Heiduschka and A. Warlimont. (*Z. Unters. Lebensm.*, 57, 587.)

9. Test for Bleaching of Flour. J. Kulman. (*Chem. Listy.*, 23, 333, 375.)

10. Effect of Flour on Fermentative Power of Yeast. K. Möhs and H. Kühl. (*Z. Unters. Lebensm.*, 57, 443.)

11. Baking Quality of Wheat Varieties. F. Schnelle. (*Wiss. Arch. Landw.*, Abt. A., Pflanz. I., 1929, 471.)

### Dairy Products

12. The Object of Butter Testing. F. Lauterwald. (*Deutsche Nahrungsm.-Rund.*, No. 23, 1929.)

13. Utilisation of Skim Milk. A. Bickel. (*Z. Unters. Lebensm.*, 57, 437.)

14. Secretion of Lipolytically Active "Rancid" Milk. Koestler, Roadhouse, and Lörtscher. (*Chem. Zentr.*, 1929, i., 2116.)

15. Determination of Lactose in Milk. G. Schulze. (*Z. Unters. Lebensm.*, 57, 460.)

16. Detection of Milk Pasteurised by the Holding Method. R. Hock. (*Milch. Zentr.*, 58, 309.)

17. Control of Bacteria that grow during Pasteurisation. M. W. Yale. (*New York State Agric. Exp. Sta. Tech. Bull.*, No. 156, Sept., 1929.)

18. The Grindrod Impact Steriliser. G. J. Hucker and A. M. Hucker. (*Ibid., Tech. Bull.*, No. 155, Aug., 1929.)

19. The Number and Type of Bacteria in Commercially Prepared Infant Foods. G. J. Hucker and A. M. Hucker. (*Ibid., Tech. Bull.*, No. 153, Aug., 1929.)

20. The Sanitary Control of Commercially Prepared Infant Foods. G. J. Hucker and A. M. Hucker. (*Ibid., Tech. Bull.*, No. 154, Aug., 1929.)

### Various

21. Refrigeration and Transport of Foodstuffs. Gompertz. (*Deutsche Nahrungsm.-Rund.*, No. 23, 1929.)

22. Mèlezitose in Honey-Dew Honey from Lime. F. E. Nottbohm and F. Lucius. (*Z. Unters. Lebensm.*, 57, 549.)

23. Determination of Husk in Cocoa and Cacao Products. M. Wogenaar. (*Ibid.*, 525.)

24. Determination of Free Ammonia in Decomposing Meat. Muchlinsky. (*Z. Fleisch Milch.-Hyg.*, 39, 189.)

25. Packaging and Quick-Freezing Perishable Flesh Products. III. Sanitary Measures in Fish-Dressing Plant. C. Birdseye. (*Ind. Eng. Chem.*, 21, 854.)

26. Determining Boron Compound in Food and Drugs. II. A. S. Dodd. (*Analyst*, No. 645, 715, 1929.)

27. Heat Insulators. (Rept. No. 35. Food Investigation Dept., Sci. and Ind. Research, 1929.)

28. Examination of Honey. J. Fiehe and W. Kordatzki. (*Z. Unters. Lebensm.*, 58, 69.)

29. Pecan Oil. G. S. Jamieson and S. I. Gertler. (*Oil and Fat Ind.*, 6, 23.)

30. Japanese Ginger. L. Rosenthaler. (*Am. J. Pharm.*, 101, 653.)

31. Monosodium Glutamate as a Chemical Condiment. J. E. S. Han. (*Ind. Eng. Chem.*, 21, 984.)

32. Some Physiological Aspects of Copper in the Organism. F. B. Flinn and J. M. Inouye. (*J. Biol. Chem.*, 84, 101.)

33. Alleged Relation of Carotin to Vitamin A. Duliere, Morton, and Drummond. (*J. Soc. Chem. Ind.*, 48, 316 T.)

34. Determination of Total Geraniol Content of Citronella Oil. M. Van der Silk and J. Vermeulen. (*Chem. Weekblad.*, 26, 482.)

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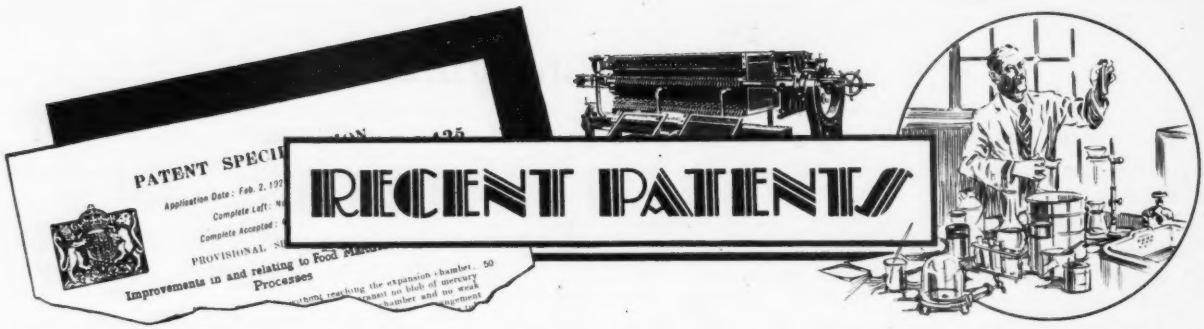
### Abstract of Paper Read before the Society of Public Analysts on December 4, 1929

*The Changes with Age of the Hydrogen-Ion Concentration of Egg-White and Egg-Yolk.* By J. C. Baird, B.Sc., A.I.C., and J. H. Prentice, B.Sc., A.I.C.

Determinations of hydrogen-ion concentration by means of a quinhydrone electrode indicated that the normal pH value of fresh egg-white is approximately 8·6, and that there is a rapid rise in the course of the first week of storage to a level of about pH 9·0, at which figure the reaction remains fairly constant. The fresh yolk has a reaction of approximately pH 6·0, which in the course of 10 weeks rises to about 6·2. Since commercial eggs are several days old at least, the method cannot be used to determine the age of such eggs. The refractive index of the egg-white is constant at about 1·360.




*These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents, and are published by permission of the Controller of H.M. Stationery Office.*

### Latest Patent Applications.

37137. BRAUN, A., ROSENBERG, F., FISCHL, E., FISCHL, J., and FISCHL'S SOHNE, M.: Production of yeast. Dec. 4.

37148. DORR CO.: Manufacture of sugar. Dec. 4.

36883. KELLOGG CO.: Production of cereal food product. Dec. 2.

36020. BEI, D. DE and MONETA, G.: Vessels for cooking foods. Nov. 25.

36777. BLOW, G. E.: Sorting apparatus for dried fruit. Nov. 30.

### Specifications Published.

322,261. THOMPSON AND CO.'S IDOLICE SPECIALITIES, LTD., H., and THOMPSON, E. J.: Food preparations.

306,536. VIARDOT, L.: Apparatus for cooking foodstuffs.

321,986. JASTRZEBSKI, D.: Preservation of food.

*Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.*

### Abstracts Published.

320,826. **Sugar.** STEWART AND CO., LTD., D., London Road, Iron Works, and CROSBIE, J. B. TALBOT, 26, West Nile Street, both in Glasgow.

In the manufacture of sugar where the sugar is extracted by diffusion and the juice is purified by treatment with lime and carbon-dioxide and filtered, the sweet water separated from the pulp and the water pressed from the pulp in pulp presses is neutralised by means of the filter press cake from which it removes residues of sugar. The neutralised water is refiltered and returned as diffusion water to the diffusion process.

317,335. **Cocoa preparations.** MARKS, E. C. R., 57, Lincoln's Inn Fields, London.

In a process for treating cocoa beans, the beans are placed in a rotating cylinder with about a quarter their weight of boiling water and are subjected to agitation while being maintained at a temperature of about 120-130° F. for about 20 minutes. The beans are heated in the same vessel at 160-170°F. for half an hour under reduced pressure for the purpose of reducing the moisture content of the beans to 1-2 per cent. The beans are now heated at 223-228° F. and agitated or stirred for the purpose of removing the last traces of moisture and for developing the aroma and flavour of the beans. The beans are rapidly cooled, preferably by suction, to room temperature, 65-70° F., cracked, degermed, and hulled. The nibs are then reduced to the required degree of fineness in a disintegrating and emulsifying device at a temperature of 90-100° F. The cocoa liquor may be fed into a receiver and converted into chocolate in the ordinary manner. The chocolate so produced may be mixed with bran flakes produced by the process described in Specification 217,634.

## Recent Trade Marks

*This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.*

#### THE OPEN ROAD

507,091. **Cooked food consisting of a mixture of meat and vegetables.** HAROLD PRIESTMAN, 85, Handside Lane, Welwyn Garden City, Hertfordshire. Dec. 11.

#### KING COLE

503,055. **Margarine and cheese.** The Firm trading as CARDOWAN CREAMERIES, 140, Glenpark Street, Dennistoun, Glasgow. Dec. 4.

#### GECA

507,195. **Margarine.** A. J. MILLS AND CO., LTD., Colonial House, Tooley Sreet, London, S.E. 1. Nov. 27.

#### DRIXO

506,706. **Preparations of malt for use as food.** EDWARD CHARLES SPENCER, "The Park," Sywell, Northampton. Nov. 20.